To the Graduate Council:

We are submitting herewith a dissertation written by Neil D. Robison entitled "An Analysis and Interpretation of the Faunal Remains from Eight Late Middle Woodland Owl Hollow Phase Sites in Coffee, Franklin and Bedford Counties, Tennessee." We have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

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We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

AN ANALYSIS AND INTERPRETATION OF THE FAUNAL REMAINS FROM EIGHT LATE MIDDLE WOODLAND OWL HOLLOW PHASE SITES IN COFFEE, FRANKLIN AND BEDFORD COUNTIES, TENNESSEE

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Neil Douglas Robison

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ABSTRACT

The faunal remains examined for this study were from eight late Middle Woodland Owl Hollow phase sites situated on the upper Duck and Elk rivers, or their tributaries in Tennessee. Three of these sites (40CF108, 40CF111 and 40CF32) were located on the Duck River within the Normandy Reservoir; their excavations were sponsored by the Tennessee Valley Authority. Test excavations at the other five sites (40BD46, 40BD55, 40FR7, 40FR45 and 40CF214) were conducted as part of the Owl Hollow Archaeological Project, which was funded through a National Science Foundation grant. The results of the faunal analyses are first presented individually for each site. They were believed to be similar enough in make up, however, to view them as a single entity in the conclusion and to hypothesize an overall Owl Hollow faunal exploitation pattern. A total of 148,636 pieces of bone was examined from the eight sites combined; 7,940 of these were identifiable to at least the order level. Additionally, 118,655 freshwater snails were identified from 40BD46, 40BD55, 40FR7, 40FR45, and 40CF214. There were also 12,052 terrestrial snails identified from 40BD55 and 40FR7, and 4,725 pelecypod valves from 40BD55, 40FR7, and 40FR45.

The typical Owl Hollow faunal exploitation pattern is very similar to that earlier hypothesized by the author for the Mississippian sites in the Normandy Reservoir. Mammals, especially the white-tailed deer, are believed to have been the principal meat

resources. Birds, reptiles, amphibians, fish, freshwater snails, and mussels were utilized with some consistency and would have been important dietary supplements and sources of variety in the diet. An extensive bone tool industry was found at a number of the sites and this is also examined. The increased use of the nutritive poor freshwater mollusks and the raising of maize by the Owl Hollow peoples is seen as being the result of enforced sedentism and population pressure. The terrestrial snails found at 40BD55 and 40FR7 are not believed to have been food resources, but their presence does give some broad indications about the habitat surrounding the sites.

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CHAPTER I

GENERAL SETTING

Introduction

The Owl Hollow phase was the later of two Middle Woodland phases first defined by Faulkner (1968) from salvage excavations conducted in the Tennessee Valley Authority (TVA) Tims Ford Reservoir in Franklin County, Tennessee, by the Department of Anthropology, University of Tennessee, Knoxville. Tims Ford Reservoir is situated in the upper Elk River Valley within the Eastern Highland Rim physiographic province (Faulkner 1968). The Brickyard Phase, now known as the McFarland phase, preceded the Owl Hollow phase. One Brickyard phase site was excavated within the Tims Ford Reservoir, but the only Owl Hollow site found during the survey, 40FR7 (the Owl Hollow type site), was located outside of the maximum pool area and was thus not eligible for excavation. Projectile point and pottery types, however, suggested that the principal site component at 40FR7 was of late Middle Woodland origin. Later surveys by Bacon (n.d.) and Gordon (1973) located four additional Owl Hollow archeological sites in this area of the Eastern Highland Rim. These include the Hamby site (40CF214) on Betsy Willis Creek, a tributary of the Elk River, and the Raus (40BD46), Bomar (40BD51), and Shofner (40BD55) sites on Thompson Creek, a tributary of the Duck River. The Furniture Store or Peters site (40FR45) was found later on the Elk River floodplain near Winchester, Tennessee (Figure 1).

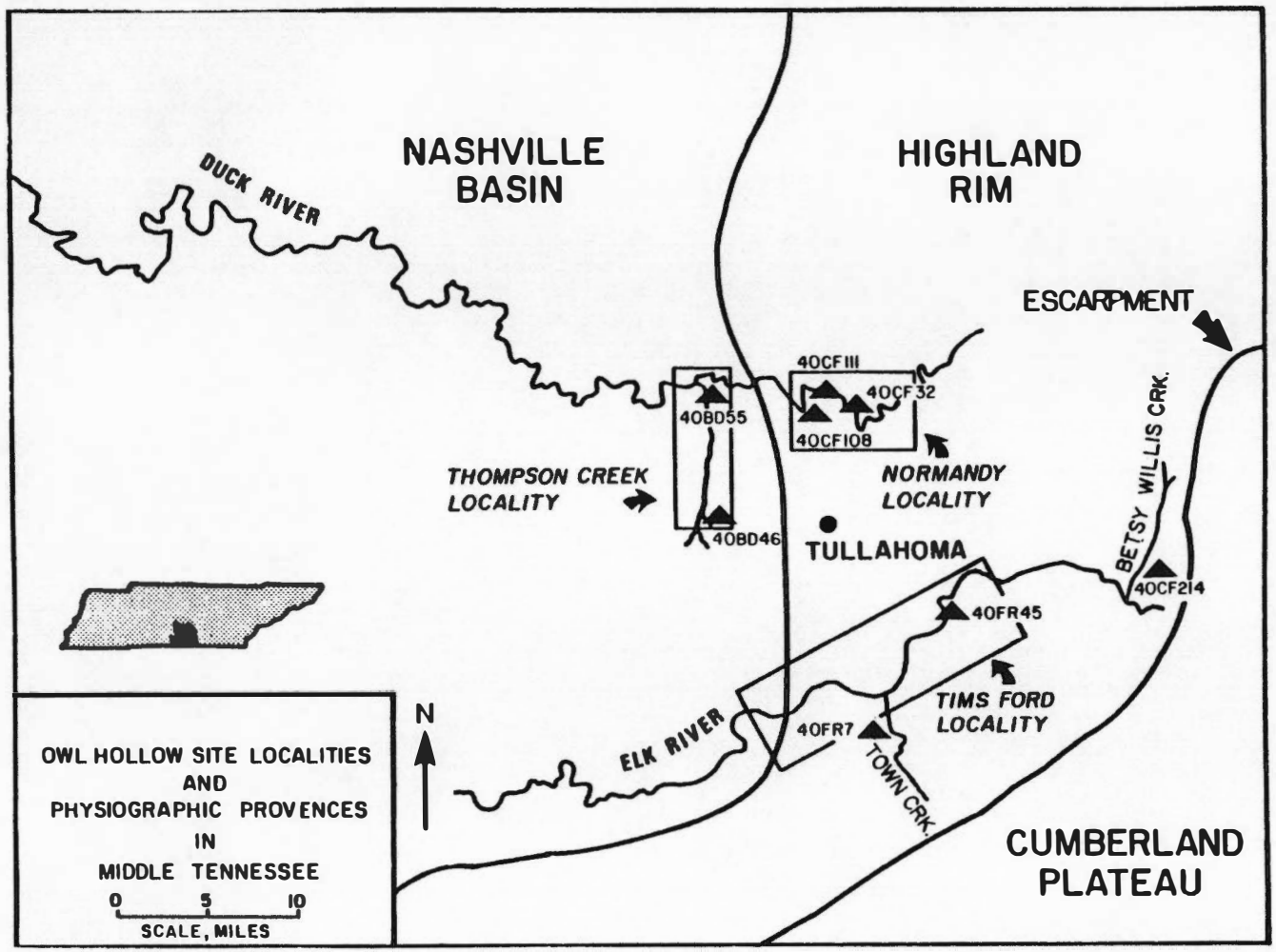

Figure 1. Owl Hollow site localities and physiographic provences in south-central Tennessee.

In 1971 the University of Tennessee Department of Anthropology began salvage excavations within the TVA Normandy Reservoir in the upper Duck River valley. Normandy Reservoir is situated in the transition zone between the Eastern Highland Rim and the Nashville Basin. Three Owl Hollow phase sites were found within the reservoir pool area, all in the broad river floodplain of the lower portion of the reservoir. These sites were Banks III (40CF108), Banks V (40CF111), and Eoff I (40CF32), excavated respectively in 1973, 1974, and 1975. The first opportunity to better define the Owl Hollow phase and to examine subsurface features came with the Normandy Reservoir excavations. Radiocarbon dates from the Normandy Archeological Project firmly dated the Owl Hollow phase to between A.D. 200 and A.D. 700.

However, since the three sites within the Normandy Reservoir did not represent the known range of Owl Hollow site variation or location, it became desirable to examine additional sites. In 1975 the Owl Hollow Project was made possible by Dr. Charles H. Faulkner's receipt of National Science Foundation Grant BNS76-11266. The purpose of this project was to conduct test excavations on a number of Owl Hollow phase sites which previously could not be investigated since they lay outside the Tims Ford and Normandy reservoir pool areas. In December of 1975 the Schofner (40BD55), Bomar (40BD51), and Raus (40BD46) sites on Thompson Creek were tested as Phase I of the project. The Shofner and Raus sites proved to be quite productive, but no major intact features were found at Bomar. During

the summer of 1976, Phase II of the project, an archeological field school was conducted at the Owl Hollow type site, 40FR7, on Town Creek near the Elk River. This major excavation uncovered a significant amount of Owl Hollow material. The Hamby (40CF214) and Peters (40FR45) sites were tested in March of 1977 as Phase III of the project. Additional limited excavations were carried out at the Shofner site in October of 1979. Each of these excavations provided data to better define the Owl Hollow phase.

A number of material or behavioral attributes are characteristic of the Owl Hollow phase. At most sites, limestone-tempered plain and simple stamped ceramics are the predominant types, with check and complicated stamped varieties being a distinct minority. Shallow side notched, and slightly expanded stemmed lanceolate spike projectile points are most frequently found in association. The bone tool industry is quite well developed, with awls and eyed needles being most common.

Most of the Owl Hollow sites appear to have been permanent settlements, often possessing evidence of both winter and summer houses. The winter houses were large round structures, solidly built with four inner posts to support the roof. Each had two earth ovens, which were generally found partly filled with chunks of burned limestone. More lightly constructed summer structures appear to have been built near the winter lodges. Cylindrical or deep basin storage pits were often found near the houses. The sites are also generally characterized by large, well formed middens created in part from the ash and burned limestone dumped out of the earth ovens.

The Owl Hollow culture utilized arboreal seed crops, herbaceous seeds, and cultigens as plant food resources. Struever and Vickery (1973) and others have suggested that some of the herbaceous seed crops such as goosefoot may have been semi-domesticated. Squash, sunflower, and maize were definitely cultivated. Maize has been found on three floodplain sites, 40CF32, 40FR45, and 40BD55, all of which date to between A.D. 400 and A.D. 600 (Crites 1978a). More will be presented later on Owl Hollow plant gathering activities and hunting patterns.

A majority of the Owl Hollow sites are located on the Eastern Highland Rim or in the adjacent Nashville Basin. Radiocarbon analyses have found most of the Owl Hollow occupations to date to between A.D. 200 and A.D. 700. Cobb and Faulkner (1978) divided the Owl Hollow phase into three chronological periods of development. The earliest period (A.D. 200 - A.D. 400) is thought to be represented chiefly at the type site (40FR7), with some additional evidence of occupation at the Normandy Reservoir sites. The Banks III, Banks V, Eoff I, Shofner, and Peters sites were thought to have been most heavily occupied during the middle period of development (A.D. 400 - A.D. 600). Late Owl Hollow cultural manifestations (post A.D. 600) were thought to have been found at the Hamby and Raus sites, and also possibly at the type site.

Cobb and Faulkner (1978) are of the opinion that early Owl Hollow sites may occur in both upland and floodplain areas. During the middle period of cultural development sites appear to have been

located almost exclusively in flood plain areas. It is during this period that maize is first noted at Owl Hollow sites. The only earlier evidence of maize in this area was two kernel fragments from a McFarland feature at the Ewell III site (40CF118) in the Normandy Reservoir (Crites 1978b) and a cupule from the McFarland type site (40CF48) (Kline et al. 1982). Late Owl Hollow sites are found in marginal and upland areas. Cobb and Faulkner (1978) are uncertain as to the exact causes of this shift, but suggest that population pressure, decreased emphasis on maize horticulture, threat of alien groups, or a combination of these and other unknown reasons may be causative factors.

This study is a detailed examination of the faunal remains from eight of the above listed archeological sites (40CF108, 40CF111, 40CF32, 40BD46, 40BD55, 40FR7, 40FR45, and 40CF214); only the Bomar site (40BD51) was excluded since insufficient faunal materials were recovered there. Both vertebrate and invertebrate remains found at these eight sites were examined. Analysis of faunal remains from these sites is important for a number of reasons. Foremost, in order to truly reconstruct the lifeways of the Owl Hollow peoples, it is necessary to identify which faunal resources were selected for utilization with respect to the total available faunal complex. These remains were quantified and examined in order to determine the relative importance of different species and classes of fauna to the Indian diet. Butchering patterns, seasonal utilization, capture methods, and use of body parts as tools were also examined.

Geology and Physiography

The upper Duck and Elk river valleys are each situated within the transitional zone between the Eastern Highland Rim and the Nashville Basin physiographic sections of the Interior Low Plateaus physiographic province (Fenneman 1938). Each of the river valley floors lies within the Nashville Basin, while the surrounding ridges are part of the Highland Rim. Formation of the Nashville Basin began at the end of the Paleozoic Era when this section was gently uplifted to form a structural dome. Subsequently the dome was eroded away, leaving older and softer Ordovician rocks at the center and outcroppings of younger Paleozoic rocks on its periphery. The surface of the Nashville Basin averages 600 feet (ft) above mean sea level (AMSL) and is rolling to hilly in nature. The Highland Rim, which has an average elevation of 1,050 ft AMSL in Coffee County and 970 ft AMSL in Franklin County, is a hilly to deeply dissected low plateau situated primarily on Mississippian strata (Love et al. 1959; Fox et al. 1958). On the eastern boundary of the Highland Rim is the Cumberland Plateau. The extremely dissected western escarpment of the Cumberland Plateau is composed of limestone and sandstone cliffs which rise 800 to 1,000 ft above the surface of the Eastern Highland Rim.

A large section of the Highland Rim in Coffee County and the northern part in Franklin County is referred to as the Barrens or the flat Highland Rim (Braun 1950). The Barrens consists of moderately

flat to slightly rolling terrain situated between the dissected escarpment of the Rim and the Cumberland Plateau. The Duck River is initially formed from several tributary streams that drain the eastern portion of the Barrens, while the Elk River has as its source a number of small tributaries in the coves of the Cumberland Plateau escarpment.

Climate

All of the study area lies within what Koppen (1931) designated as a humid, mesothermal, subtropical climate. While there are definite seasonal changes, the overall climate can be characterized as mild. In Middle Tennessee the mean annual temperature is 59.6 F and the annual mean rainfall is 50.67 inches (in) (Strand et al. 1973). The average summer temperature is 76 F, while the average winter temperature is 42 F. Below zero temperatures generally occur only on an average of once a year. The driest seasons of the year are summer and autumn, with an average of 13 and 10 in of rainfall, respectively; winter and spring, on the other hand, have the most rainfall, with averages of 17 and 15 in, respectively.

Flora

Both the upper Duck and Elk rivers lie within the Carolinian biotic province, which is characterized by a forest type of predominately deciduous trees (Dice 1973). The deciduous forests of the Carolinian biotic province have been further divided into several

forest regions. There is some question as to what is the dominant forest type of the Eastern Highland Rim. Braun (1950) feels that the transition from the Mixed Mesophytic to the Western Mesophytic forest type occurs between the dissected Highland Rim and the Nashville Basin. DeSelm (Faulkner and McCollough 1973), on the other hand, sees the Western Mesophytic forest extending from the Nashville Basin to the western edge of the Cumberland Plateau. No matter where the transition between the Western and Mixed Mesophytic forests occurs, the Western Mesophytic forest itself is considered to be a rich ecotone between the Oak-Hickory forest to the west and the Mixed Mesophytic forest to the east. It is especially significant that the sites being considered here may have been located within an ecotone area. Ecotones are thought to have had greater carrying capacities for aboriginal populations because of the increased number of plant and animal species they usually support (Faulkner and McCollough 1973).

Although beech is now often the dominant tree species of the Eastern Highland Rim, Braun (1950) feels the area formerly supported a predominately oak forest. The Barrens area of the Highland Rim was characterized by grassy openings or prairie areas in an open oak forest, and has been referred to by at least one early botanist as the "Oak Barrens" (Gattinger 1901). According to Shelford (1963) the dominant trees in the climax forest of the Nashville Basin and dissected Highland Rim were tulip poplar and oak. Beech, yellow buckeye, white basswood, American chestnut, and sugar maple were also

common, while white ash, cucumbertree, red maple, bitternut hickory, shagbark hickory, blackgum, and black cherry were present but less numerous.

Fauna

The Duck and Elk rivers and the areas surrounding them would have been rich in fauna potentially available for exploitation by the Indian inhabitants. Since the upper reaches of the two drainages are in close proximity to each other their faunal assemblages are very similar in composition. The chief differences lie in the aquatic resources, i.e. fish, mussels, and freshwater snails. Almost all of the same species of mammals, birds, reptiles, and amphibians should have been available for exploitation in both areas. Complete listings of the fauna potentially found in these areas are presented in Appendix A. The fish, mussel, and freshwater snail species are listed separately by river system to show the differences that exist between the drainages.

Approximately 58 species of native North American mammals can currently be found in Middle Tennessee (Barbour and Davis 1969; Hall 1981; Whitaker 1980). Seven additional mammal species once found in this region but now extirpated include the black bear, gray wolf, mountain lion, porcupine, fisher, elk, bison, and possibly the red wolf. All of these species, except for the bison, would have been available for exploitation by the Owl Hollow peoples. The bison is thought to have been only a very recent arrival east of the Mississippi River (Griffin and Wray 1945, Rostland 1960).

About 250 species of birds can presently be found in the study area (Ganier 1933; Peterson 1980; Robbins et al. 1983). Two additional species, the passenger pigeon and the Carolina parakeet, were formerly found in the area but are now extinct; a third species, the greater prairie chicken, is now locally extirpated. Not all of these 250 species were permanent residents nor would they all have been available at one time. Some of these species appear in Tennessee on only a seasonal basis, others only migrate through while traveling between their summer and winter ranges, and a few are of only accidental occurrence.

At least 43 species of reptiles inhabit Middle Tennessee in the region of the upper Duck and Elk rivers (Conant 1975). These include 12 species of turtles, 23 species of snakes, and 8 species of lizards.

Thirty-one species of amphibians are presently found in the study area (Conant 1975). These entail 19 species of salamanders and 12 species of toads and frogs.

One hundred thirty-two species of fish have been recorded for the Duck River (Nieland n.d.) and 103 species have been found in the Elk River (Jandebeur 1972). Although not collected, Nieland (n.d.) feels that an additional eight fish species might be expected in the Duck River drainage.

Sixty species of native freshwater mussels have been collected from the Elk River (Isom and Yokley 1972), and 50 species have been found in the Duck River (Ortmann 1924; Isom and Yokley 1968). Each

of these rivers possesses a rich and diverse naiad fauna, but in neither case is the entire mussel species assemblage found in the upper reaches of the stream. Of the 60 species found in the entire Elk River, only 40 were identified in the upper reaches of the river now dammed to form the Tims Ford Reservoir (Isom and Yokley 1972). Only 13 mussel species out of a total of 50 for the Duck River have been collected from the upper portion of the stream within what is now the Normandy Reservoir (Ortmann 1924; Isom and Yokley 1972). Those species present within the upper reaches of the Duck and Elk rivers would have been smaller and more compressed than many of their counterparts further down stream. Freshwater mussels would have been available from a number of different riverine habitats, but those endemic to shoals and riffle areas would have been most accessible to Indian utilization.

Within the Elk River there are presently at least two species of viviparid and ten species of pleurocerid freshwater snails (Bickel 1968; Robison n.d.). The Duck River possesses at least two species of viviparid and nine species of pleurocerid snails (Bickel 1968; Robison n.d.). Based upon shell morphology many of these snail species can be divided into different forms. Distribution of these forms is often determined by their location in the river, the smaller, less robust and less sculpted forms are most often found in upriver habitats. The larger, heavier and more sculpted forms generally occur farther downstream (Goodrich 1934a). By noting the different forms of snails collected from each site it may be possible

to tell whether they were collected from near the archeological site or from further up or down stream.

Bickel (1968) notes that there are at least 225 different species and forms of terrestrial snails in Tennessee. Not all of these species would have been found within the study area. No references could be located which ennumerated the species of terrestrial snails native to Middle Tennessee. Because of this, no mention of terrestrial snails is made in Appendix A. Later in the text, those species identified during the analysis will be listed and described.

CHAPTER II

BACKGROUND

Previous Faunal Studies in Middle Tennessee

A number of previous zooarcheological studies have been carried out within the Owl Hollow research project area. Most of these are connected with the Normandy and Tims Ford reservoir archeological excavations. The most expansive of these studies was done by the author on the faunal remains recovered from three Mississippian sites in the Normandy Reservoir, 40CF5, 40CF32, and 40CF111 (Robison 1978). Additional Mississippian faunal remains from 40CF32 were found after the author had completed his 1978 study. These remains were examined and combined with the earlier work; the results were presented in Volume 8 of the Normandy Archaeological Project reports (Chapman 1982). An additional presentation of the 40CF5 Banks phase Mississippian faunal remains is published in Volume 7 of the same series (Robison 1982).

Faunal studies by Parmalee in the Normandy Reservoir include the Banks III site (40CF108) (Faulkner et al. 1976), Banks V (40CF111) (Cobb 1978), Rhoton Cave (40CF46) (Faulkner and McCollough 1974), Nowlin II (40CF35) (Parmalee 1978: 171-174), and Ewell III (40CF118) (DuVall 1982). Cultural components at these sites include Late/Terminal Archaic, Middle Woodland, and Mississippian for 40CF108, late Middle Woodland and Mississippian for 40CF111, Middle

Woodland for 40CF46, Terminal Archaic for 40CF35, and early Middle Woodland (McFarland) for 40CF118. The Owl Hollow materials analyzed by Parmalee for 40CF108 and 40CF111 have been used in this study, but the Middle Woodland material recovered from 40CF46 was not sufficiently defined for use here. Bogan (1978) examined a small number of faunal remains from the Wiser-Stephens I site (40CF81). Wiser-Stephens I was a multi-component site with occupations dating from the Late Archaic to the Late Woodland periods, but the majority of the faunal remains came from the McFarland and Mason phase features.

Other analyses of Normandy Reservoir faunal materials include the author's work on small faunal collections from 40CF69, the Aaron Shelton site (Wagner 1982) and 40CF37, the Jernigan II site (Faulkner and Robison 1982). Both are multicomponent sites; faunal materials were recovered from Archaic Ledbetter and Wade features at 40CF69 and Early Woodland features at 40CF37. A faunal analysis was also conducted by the author on the Owl Hollow faunal remains from 40CF32. The results of this analysis, which will be used in this study, were first reported by Cobb (1982) in his overview of the late Middle Woodland occupation at 40CF32.

On the upper Duck River, outside the Normandy Reservoir, excavations were conducted on the McFarland phase type site (40CF48) in 1979, but the preservation of faunal remains was poor. Those remains recovered were analyzed by the author and reported in Kline et al. (1982).

Parmalee (1968a, 1968b, and 1968c) analyzed three collections of archeological faunal remains from Tims Ford Reservoir. These analyses include materials from the Mason (40FR8), Brickyard (40FR13), and Tucker Rock Shelter (40FR16) sites. Site 40FR8 was predominantly a Late Woodland settlement, 40FR13 possessed Mississippian, Woodland and Archaic components, and 40FR16 was occupied during the Archaic and Woodland periods.

There have also been a number of faunal analyses done on material from sites outside the project area, but within Middle Tennessee. Guilday (n.d.) examined the faunal remains from five sites (40SW24, 40SW27, 40SW32, 40SW33, and 40SW43) that were excavated along the Cumberland River in Stewart County, Tennessee. Site components ranged from the Late Archaic through Mississippian periods.

Additional work was done by Parmalee (1966a; 1966b) on two sites in Nickajack Reservoir in the Tennessee River Valley of south-central Tennessee. The Bible site (40MI15) was fundamentally a Late Archaic occupation while the Lay site (40MI20) was primarily an Early Woodland settlement. Guilday and Tanner (1966) analyzed the faunal remains from the Westmoreland-Barber site (40MI11) in Nickajack Reservoir. Westmoreland-Barber was a multicomponent site which contained occupations ranging from the Archaic to Late Woodland. More recently Klippel and Parmalee (1982) conducted an intensive analysis of the faunal remains recovered from Cheek Bend Cave in the proposed Columbia Reservoir on the Duck River. These materials were

found in stratified deposits dating from the late Pleistocene to the very recent Holocene.

Methodology

Field Methodology

Since the faunal remains examined in this study are from a number of Owl Hollow sites excavated by different crews over a period of several years, it might be best to first comment on the field methodologies used to recover and initially process them. Three Normandy Reservoir sites, 40CF32, 40CF108, and 40CF111, possessed major Owl Hollow components. At all three of these sites the fill from each feature was waterscreened through a window screen (1x1.5 mm) mesh. Flotation samples processed from these features varied from 2.5 to 5 gallons depending on the size of the feature. Flotation was accomplished by Struever's (1968) immersion technique.

In December of 1975 excavations were conducted at the Raus (40BD46) and Shofner (40BD55) sites on Thompson Creek, a tributary of the Duck River. At the Raus site, fill from the features and midden deposits was dry screened through 1/4 inch (in) hardware cloth or shovel sorted. Excavators were not permitted to use water screening at the site. Standardized 2.5 gallon soil flotation samples were taken from the features and midden and were returned to the archeology lab at the University of Tennessee, Knoxville. There the material was processed through an indoor flotation device very similar to that used by Patty Jo Watson (1976) for her work on the Green River (Cobb and Faulkner 1978).

During the 1975 excavations at the Shofner site, the fill from Features 1, 3, and 4 was processed through 1/4 in (6 mm) mesh hardware cloth. A 2.5 gallon soil sample was returned to the Knoxville lab from each of these features to be processed through the indoor flotation machine. However, since the fill from Feature 2 was exceptionally full of shell, bone and plant remains, it was returned to Knoxville in its entirety to be processed through the flotation machine. Additional excavations were conducted at the Shofner site in September of 1979. Three features (Features 5, 6, and 7) were excavated during the 1979 season, and the entire fill from each was processed through an outdoor water flotation system very similar to that discussed by Watson (1976).

The Owl Hollow type site, 40FR7, underwent eight weeks of intensive excavation in the summer of 1976. Soil from all features, midden levels, and most postholes was waterscreened through a window screen mesh (1x1.5 mm). A 2.5 gallon soil sample was saved from each midden level, feature, and selected postholes for processing in the indoor flotation device (Cobb and Faulkner 1978).

In March of 1977 archeological testing was conducted on the Peters (40FR45) and Hamby (40CF214) sites. All feature and posthole fill at these sites was passed through a 1/4 in mesh screen with at least, and often more than, a 2.5 gallon soil sample saved from each feature to be processed with the laboratory flotation device.

Laboratory Methodology

As a first step in the analysis, all faunal materials from each feature were separated into four basic categories: bone, shell (mollusca), egg shell, and fish scales. The following discussions will illustrate how the analysis of each of these major categories was conducted.

The bone from each feature was first sorted into the five vertebrate classes: mammal, bird, reptile, amphibian, and fish. When possible, each bone fragment was identified as to which skeletal element it represented. Next, an attempt was made to identify recognizable skeletal elements to the order, family, genus, or species level within each class. Identifiable bone elements were then sided, when possible, and any butchering and/or skinning cuts and pathologies were noted. Bone identifications were made by comparing the archeological remains with skeletal specimens housed in the Zooarchaeology Section, Department of Anthropology, The University of Tennessee, Knoxville.

Unidentifiable bone fragment totals were tabulated for each vertebrate class. The unidentifiable mammal bone fragments were categorized as Indeterminate Large Mammal Bone Pieces and Indeterminate Small Mammal Bone Pieces. Division of the indeterminate mammal bones into the Large or Small categories involved subjective judgement on the part of the author. Those bone fragments that were large or thick enough to obviously have come only

from animals such as elk, white-tailed deer, bear, cougar, or wolf were considered to be Indeterminate Large Mammal Bone Pieces. Small Mammal Bone Pieces were those bone fragments obviously from small mammals such as squirrels, rabbits, raccoons, and foxes, or from bones fragmented into such small pieces that it was impossible to speculate on the size of the animal from which they originated.

Burned bone seemed to be uniformly scattered throughout most features, so no attempt was made to quantify it separately from unburned bone. The author, in a previous study of faunal remains from Mississippian sites in the Normandy Reservoir, found no patterning to the distribution of burned bone over the sites. The burned bone fragments are thought to have been fired either during food preparation or accidently when scrap bone may have been thrown or kicked into the campfire.

The Minimum Number of Individuals (MNI) technique, in conjunction with White's method of calculating usable meat weights, was utilized as a means of quantifying the importance of different animal species used in the Owl Hollow diet. In the following passage the methods used in applying these two techniques are described.

> As used by the author, the minimum numbers method involves identifying the most abundant element of each species examined into left and right components, noting which side contains the greater number of pieces. The group containing the greater number of pieces is then used as the minimum number of individuals (MNI) for the species being examined. In an effort to calculate the minimum number of individuals as accurately as possible, the elements from the less numerous of the two groups are compared with those of the larger group. If any of the elements from the less numerous group fail to match those of the larger group because of differences in age, size, or

> sex, the minimum number of individuals can then be increased by the number of elements from the smaller group that obviously cannot be paired. In order to calculate the total amount of meat per species at each site, the minimum number of individuals for each species was multiplied times the pounds of usable meat from one animal of that species. Data on processed meat weights of animals were obtained from White (1953: 397-398) and Parmalee (personal communication). Meat weights were not figured for animals not considered food items or those for which data were not available. Estimated pounds of meat for fish was especially difficult to calculate due to the fragmented condition of the fish sample and because comprehensive data on weights of numerous fish species are lacking. (Robison 1978).

The minimum numbers method of quantifying the relative importance of animal species in prehistoric diets has recently been undergoing close scrutiny as to its effectiveness. Grayson (1973, 1978, and 1979), Casteel (1977), and Wing and Brown (1979) have been especially notable in their efforts to point out the shortcomings of the MNI method and to suggest alternative methods or means of making it more accurate. In calculating the MNI for this study, the faunal sample from each site was treated as a single aggregate; no attempt was made to calculate MNI for separate features or site areas, as per Grayson's (1978: 60) "minimum distinction" approach.

Grayson (1978: 54) noted that ". . . within any site, taxa represented by smaller bone samples . . . contribute proportionately greater minimum numbers of individuals (MNI) than do taxa represented by larger bone samples." This phenomenon was felt to exaggerate the importance of rarer animals in the overall diet. As a means of overcoming this problem, Grayson (1978) suggested that the faunal sample should be divided into clusters of taxa within which, but not

between which, MNI may be compared. The composition of these clusters is to be determined by the number of identifiable elements for each species; through the use of a statistical formula species with only a few identifiable elements would be placed in one cluster, while species with more numerous identifiable elements would be separated into another one or more clusters. The number of elements needed to make these distinctions varies with the overall sample size and the way in which minimum numbers are calculated (Grayson 1978).

While the MNI comparability problem is recognized, the author has chosen not to use Grayson's (1978) suggested approach. It is felt that the importance of various species in the Owl Hollow diet can be adequately documented and compared in the discussion sections, without dividing the samples into clusters which cannot be validly compared to each other (Grayson 1978). Those species most important to the diet should be represented by more numerous MNI counts unless there were special provisions for the disposal of a species' remains (i.e. bears). Species represented by smaller MNI counts were probably less important in the overall diet, either because they were not abundant in the area or because they were not considered desirable food resources. Numerically small faunal samples may also affect the MNI count, but caution will be exercised in the text to point out where the faunal sample is believed to be less than adequate.

White's (1953) method of calculating the amount of meat contributed to the diet by different animal species has also been

questioned, particularly his method of estimating the percentage of usable meat for different animal species. Stewart and Stahl (1977) believe that for most of the species considered by White, he overestimated the percentage of usable meat that could be obtained after butchering. They recommend caution in using his figures and suggest that additional work needs to be done on estimating edible meat weight from average live weight for different species. It has also been suggested that many of the "average" live animal weights used by White may be inappropriate to use in the Southeast and other parts of the country since White was often dealing with species which have larger forms in the northern Plains. The author recognizes the shortcomings in White's (1953) calculations for usable and live meat weights, but has chosen to use them in any case. With archeological materials it is impossible to calculate with complete accuracy the total weight of meat which would have been used by the inhabitants of a single site. Calculations of this sort are affected by preservation of the faunal materials, Indian disposal patterns, archeological recovery techniques, condition and age of the animals taken, and so forth. The value of calculating the pounds of usable meat for each species does not lie in its absolute accuracy, but in its usefulness for determining the relative frequency each species makes up of the estimated total amount of meat available at a site. Those animal species which were frequently taken and made up a large portion of the usable meat available at a site would have been the principal meat resources utilized by the Indian inhabitants.

The average meat weights obtainable from the species identified during this study are displayed in Appendix B. Meat weights were not available for all species.

For each of the eight sites examined here there is a general table which includes the number of bone fragments for each vertebrate species, the percentage this number represents of all identifiable bone, the minimum number of individuals for each species, the estimated pounds of meat derived from each species, and the percentage this amount represents of the total calculable meat available at the site. Each of these tables also includes the number of indeterminate bone fragments for each vertebrate class, but these totals were not used in calculating any of the percentages.

There were basically four types of mollusca examined for this study: freshwater pelecypods, freshwater gastropods, terrestrial gastropods and marine gastropods. In certain cases, due to the overwhelming volume of material, subsampling measures were used to choose a representative portion of the collection to be examined. All freshwater pelecypods from each site were identified, when possible, to at least the genus level. Pelecypods were also divided into left and right valves and the MNI was calculated for each species on the basis of whether there were more left or right valves.

With the exception of Feature 2 at 40BD55, all freshwater gastropods recovered at each site were analyzed. Identifications were made to at least the genus level. Because of the quantity of materials present, subsampling procedures were deemed necessary for

Feature 2 at 40BD55. Feature 2 was a large basin feature that was excavated in four quadrants of roughly equal size. In the lab the freshwater snails from each quarter of the feature were passed through a riffle sorter twice to divide the entire feature into 1/32nd samples. Four 1/32nd samples, one from each feature quadrant, were arbitrarily chosen for analysis. This method of sampling Feature 2 was thought to be valid since the feature appeared to have been quickly filled with shell and displayed no obvious stratigraphic divisions.

Preliminary examination of the freshwater gastropod families Viviparidae and Pleuroceridae reveals a great deal of confusion concerning the taxonomy of certain species and sometimes even genera within these families. This was found to be especially true for the genus Campeloma, about which Clench (1962) stated that few genera of North American mollusks are in a more disorganized state on a specific level. Because of the confusion concerning the taxonomic relationships between the various species of Campeloma, those archeological specimens recovered will be identified only as Campeloma spp.

Problems also exist concerning taxonomic relationships of certain species of snails within the family Pleuroceridae. These problems are mainly the result of morphological or form differences within a species that are caused by environmental polymorphism (Goodrich 1934) and/or geographical isolation. This confusion in determining species relationship is enhanced by the fact that several

forms of the same species sometimes coexist in the same locality and some interbreeding may occur between different species within the same genus (Davis 1974). The author has, where disagreement exists over a snail's status as a separate species or a form, chosen to describe the snail as a form. Until additional research proves the assumption wrong, it would seem to be a valid approach to group a number of pleurocerid snails together as forms of a single species rather than considering each to be a separate species. Numerous malacologists, including Tryon (1873), have remarked that further research will probably result in the reduction of the actual number of pleurocerid species.

Controversy also exists over the division of the family Pleuroceridae into genera. Participants in this controversy might be divided into two camps, "lumpers" who attempt to group large numbers of pleurocerid species into a few genera, and "splitters" who follow a more traditional approach in retaining a large number of genera as defined in the past. Rather than becoming enmeshed in these current debates over the "lumping" or "splitting" of pleurocerid genera, the author has used the established generic titles as given by Goodrich (1940) and continued by Bates and van der Schalie (1977).

Terrestrial gastropods presented special problems for analysis because of their large numbers and often extremely small sizes. This was especially true for the smaller species which could only be identified by using a microscope; these were generally found in the samples in vastly greater numbers than the larger species. In order

to make the analysis of the smaller species more manageable, a subsampling strategy was adopted. Each collection of terrestrial snails was passed through a geological screen with a 4 mm mesh, dividing each collection into two subsets, one composed of shells greater than 4 mm in size and another in which the shells were equal to or less than 4 mm in size. All snails greater than 4 mm in size were retained for analysis, while those equal to or less than 4 mm in size were passed through a riffle sorter three times to divide each feature or midden sample into eighths. From each feature or midden level, 1/8 of each terrestrial snail sample less than or equal to 4 mm in size was retained for analysis.

Marine gastropods were found only at the Owl Hollow type site (40FR7) and Banks V (40CF111). They were present in very small numbers and all were analyzed.

CHAPTER III

SITE AND FAUNAL REMAINS DESCRIPTIONS

Introduction

The following descriptions give general information about the location, excavation, and chronology of each study site. Tables list the animal species recovered, the number of elements present for each, the minimum number of individuals, and where possible the total estimated usable pounds of meat available for each species. Also included are general discussions of the dietary importance of the animals at each site, site seasonality, butchering patterns, and bone or shell tool manufacture methodology. The sites are ordered according to their date of excavation. Detailed background descriptions of the animal species are usually not given within the individual site discussions since this would often be repetitious. These will instead be presented in the concluding summary chapter. The concluding chapter summarizes the data from all the sites and attempts to show the changes or consistencies of the Owl Hollow faunal exploitation pattern through the late Middle Woodland period.

The Banks III Site (40CF108)

The Banks III site was tested during the summer of 1972. Full scale excavations were initiated in the autumn of the same year. Additional exavations were carried out at the site in 1973 by a crew

of amateur archeologists under the direction of Williard S. Bacon and Travis W. Binion.

Testing found that 40CF108 was a multicomponent site, with Middle and Late/Terminal Archaic, Middle Woodland, and Mississippian cultural manifestations. The Middle Woodland component was one of the principal occupations at the site.

The Banks III site is situated on the left descending bank of the Duck River on a low knoll of the first terrace above the floodplain at the downstream end of a long river bend. Using 35° 27' 30" North 86° 15' West as a reference point, the site lies 4,100 ft along azimuth 32 degrees east of north. Elevations at the site ranged between 816-818 ft AMSL. Armour silt loam was the principal soil type. Site dimensions were estimated to be approximately 300 by 800 ft. A large late Middle Woodland component was also found at the Banks V site (40CF111), which was located on the same terrace at the upstream end of the river bend.

Excavations at 40CF108 produced numerous late Middle Woodland postholes and features, several midden areas, and at least four houses. Two were double earth oven winter lodges and two were thought to be summer houses. While a portion of the site's plowzone was taken away with a self-loading pan, the plowzone from over the midden and house areas was removed by skim shoveling and troweling. A majority of the late Middle Woodland faunal remains was recovered from the earth ovens within the winter structures.

Fifteen radiocarbon determinations were obtained from features

(Feat.), postholes (P.H.), and postmolds (P.M.) at 40CF108 (Table 1). Of these, 12 were believed to be from Middle Woodland contexts, generally from Owl Hollow features. Only the radiocarbon assays believed to be from Middle Woodland contexts are presented in Table 1; as will be noted, most of these are from Structures I, II, III, and IV (Faulkner and McCollough 1974). All the radiocarbon dates were obtained from the University of Georgia Geochronology Laboratory.

Structure I was an oval, tensioned wall house which measured approximately 22 ft by 25 ft. This structure was thought to have been a summer house because of its lighter construction and lack of interior earth ovens. A single radiocarbon date of A.D. 360 ± 315 was derived from unburned bone recovered from the house central support posthole and a doorway posthole. Faulkner and McCollough (1974) believe that this is an Owl Hollow structure. Excavations revealed that the house had been constructed on top of a midden deposit which measured approximately 50 ft by 70 ft and was from 0.3 to 0.5 ft thick. Bone was poorly preserved in this and the other site middens.

Structure II was an Owl Hollow double earth oven winter lodge which measured approximately 30 ft by 26 ft. A midden deposit that measured nearly 40 ft by 25 ft was found to the west of the house, on the river side. The very dark midden soil with its concentrations of burned limestone is thought to have been formed from the discharge from the earth ovens in the winter houses. The midden deposit under Structure I was probably formed in a similar manner.

Table 1

40CF108 Radiocarbon Dates

Feature No.	Sample No.	Dates
Feat. 58	UGa-595	1800 ± 75 B.P. (A.D. 150)
Feat. 100	UGa-596	1785 ± 155 B.P. (A.D. 165)
Feat. 163	UGa-616	1825 ± 145 B.P. (A.D. 125)
Structure I		
P.H. 169 and 383	UGa-741	1590 ± 315 B.P. (A.D. 360)
P.H. 172, 350-354, 356, 362 and 383	UGa-613	3410 ± 1595 B.P. (1460 B.C.)
Structure II		
Feat. 56	UGa-576	1760 ± 400 B.P. (A.D. 190)
Feat. 59	UGa-577	2095 ± 430 B.P. (145 B.C.)
Structure III		
Feat. 83	UGa-573	1460 ± 130 B.P. (A.D. 490)
Feat. 89	UGa-514	1240 ± 140 B.P. (A.D. 710)
P.M. 418	UGa-575	1470 ± 515 B.P. (A.D. 480)
Structure IV		
P.H. 588	UGa-662	1485 ± 145 B.P. (A.D. 465)
P.H. 902	UGa-663	1555 ± 185 B.P. (A.D. 395)

Structure III, which measured 39 ft by 33 1/2 ft was also an Owl Hollow double earth oven winter lodge. A small (9 ft by 6 ft by 1 in thick), dark sheet midden containing numerous pieces of burned limestone was found near the western edge of the house.

Structure IV was made up of two roughly rectangular posthole patterns, one within the other. The outer wall measured approximately 29 by 33 ft, while the inner wall measured nearly 15 by 21 ft. Faulkner and McCollough (1974) suggest that this may be a tensioned arbor-roof structure, but this is only a tentative hypothesis subject to review. Radiocarbon analyses on materials from the inner and outer posthole patterns yielded dates of A.D. 395 and A.D. 465 respectively, both well within the late Middle Woodland Owl Hollow period.

The fill from all features and postholes was water screened through window screen mesh. "Conventional flotation was employed to process considerable, but not strictly controlled or calculated, proportions of the fill of those features and postholes which obviously contained charred floral remains" (Faulkner and McCollough 1974: 262-263).

McCollough and Faulkner (1976), in Table 48 of Volume 3 of the Normandy Archaeological Project reports, designated 12 features at 40CF108 as definitely being of Owl Hollow origin. Table 45 of Volume 2 from the same series fully describes all the faunal remains identified by Parmalee from 40CF108 (Faulkner and McCollough 1974). The data presented in this table were utilized to calculate the bone

totals and MNI for the 12 Owl Hollow features. In carrying out this procedure, it was noted that the bone totals for the 12 features calculated using the Table 45 data (Faulkner and McCollough 1974) in some cases did not match those presented in Table 48. The reason for these discrepencies is unknown, but it was decided to utilize the bone totals derived from the more detailed 1974 data.

A total of 2,243 bones and bone fragments was found in the 40CF108 Owl Hollow features (Table 2). All five vertebrate classes were represented in the sample, but mammal bone was found to be by far the most numerous (2,074 pieces or 92.46% of the total collection). Of the total 2,243 skeletal remains in the sample, only 140 were identifiable to at least the order level. In examining the identifiable bone an anomaly becomes apparent. Based upon the sheer numbers of identifiable bones present in the sample, reptiles would appear to have been the most heavily used category of vertebrate animals in the diet at 40CF108. These figures are misleading, however, since even fragmentary snake and turtle bones are generally identifiable to at least the order level. They are, therefore, over represented in the pieces counts relative to their actual importance in the Indian diet.

The over-representation of reptiles in the identifiable bone samples was found to be the case for all the sites examined for this study. A more accurate assessment of an animal's or animal group's importance would be the amount of meat it contributed to the diet relative to the other species utilized. In applying these criteria,

Table 2

Vertebrate Fauna Identified from the Banks III Site (40CF108)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Eastern Mole, *Scalopus aquaticus*	1	1	.71	-	-
Woodchuck, *Marmota monax*	1	1	.71	5.60	4.81
cf. Rice Rat, *Oryzomys palustris*	18	1	12.85	-	-
Cottontail, *Sylvilagus floridanus*	2	1	1.42	1.75	1.50
White-tailed Deer, *Odocoileus virginianus*	14	1	10.00	100.00	85.94
Total Ident. Mammal Bone Pieces	36	5	25.69	107.35	92.25
Indet. Mammal Bone Pieces	2,038				
Total Mammal Bone	2,074				
Birds					
Bird (Passerine sp.)	1	1	.71	-	-

Table 2 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total Ident. Bird Bone Pieces	1	1	.71	-	-
Indet. Bird Bone Pieces	7				
Total Bird Bone	8				
Reptiles					
Snapping Turtle, *Chelydra serpentina*	2	1	1.42	7.50	6.44
Stinkpot, *Sternotherus* cf. *odoratus*	3	1	2.14	-	-
Map Turtle, *Graptemys geographica*	1	1	.71	1.50	1.28
cf. Map Turtle, *Graptemys* sp.	1	1	.71	-	-
Turtle, spp.	69	-	49.28	-	-
Snake, spp.	19	1	13.57	-	-
Total Ident. Reptile Bone Pieces	95	5	67.83	9.00	7.72

Table 2 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Amphibians					
Salamander, sp.,	1	1	.71	-	-
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	1	1	.71	-	-
Frog/Toad spp.	2	1	1.42	-	-
Total Ident. Amphibian Bone Pieces	4	3	2.84	-	-
Fish					
Redhorse, *Moxostoma* sp.	1	1	.71	-	-
Sucker, Catostomidae	1	1	.71	-	-
Catfish, *Ictalurus* sp.	1	1	.71	-	-
Catfish, cf. *Ictalurus* sp.	1	1	.71	-	-
Total Ident. Fish Bone Pieces	4	4	2.84	-	-
Indet. Fish Bone Pieces	58				
Total Fish Bone	62				

Table 2 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total All Ident. Bone	140	18	99.91	116.35	99.97
Total All Indet. Bone	2,103				
Total All Bone	2,243				

mammals rather than reptiles are seen to be the most important group in the Owl Hollow diet. At 40CF108 there were found to be 107.35 estimated pounds of meat for mammals against 9 pounds of estimated meat for reptiles.

The skeletal remains of at least five mammal species were found in the 40CF108 faunal sample. Most probably the rice rat and the eastern mole were natural inclusions in the site matrix. It should be noted, however, that a mole radius exhibiting definite butchering cuts was recovered from the Mississippian component at 40CF111 (Parmalee 1975). The woodchuck, cottontail and white-tailed deer would all have been utilized as meat resources.

Avian remains were surprisingly scarce at 40CF108; only eight bird bone fragments were recovered. One of these was identified as being from an indeterminate species of passerine bird, but the remaining pieces were completely unidentifiable.

Reptiles were better represented in the faunal sample with at least three species of turtle and one species of snake present. All three of the turtle species are aquatic varieties. Except for the coldest winter months, the snapping, stinkpot, and map turtles would have been available for exploitation. It is suggested that all three of these aquatic species were probably captured in nets while fishing, since they are extremely wary when sunning out of the water.

Amphibian remains occurred infrequently, with only four skeletal elements from two species recovered. Both the salamander and the spadefoot toad were probably natural inclusions at the site. Each

occurs naturally in the site area and the spadefoot toad is noted for burrowing for long periods of time, emerging generally only on wet nights during the spring breeding season (Conant 1975).

There was a total of 62 fish skeletal elements recovered from 40CF108; of these, four were identifiable to at least the family level. Two fish families are represented in the sample, the suckers (Catostomidae) and the catfish (Ictaluridae). Both suckers and catfish would have been available for exploitation the year round. Suckers, however, would have been most easily caught in the spring months (April or May) when they congregate in large numbers, in fairly shallow water, to spawn.

With such a small faunal sample it is difficult to make detailed statements concerning the seasonal occupation of the site. Faulkner et al. (1976) suggest, however, that the site was most probably occupied the year round. Of those species thought to be utilized as food resources, the cottontail and white-tailed deer and both fish species would have been available for exploitation throughout the year. Since they hibernate during part or all of the winter months, the woodchuck and snakes could only have been utilized during the warmer months of the year.

A winter occupation of 40CF108 may also be implied by the floral and structural evidence found at the site. Floral remains associated with the Owl Hollow component consist almost wholly of charred hickory nut shell fragments. These would have been harvested in the autumn and consumed through the winter months (Faulkner et al. 1976).

The double earth oven lodges are almost certainly winter dwellings built to house one or more families.

Faulkner et al. (1976) believe that the presence of certain faunal species at 40CF108, which they classify as "slow game", suggest that women and children may have been collecting most of these animals locally. The author believes this hypothesis to be rather tenuous, however, since many of these "slow game" species may be natural inclusions at the site. Those species thought to be natural inclusions include the eastern mole, rice rat, salamander, and eastern spadefoot toad. The aquatic turtles were most likely taken in nets and may have been captured at the same time as fish. Fishing may have been either a male or female activity.

The Banks V Site (40CF111)

The Banks V site was tested during the autumn of 1972 and the spring of 1973. It was found during test excavations that 40CF111 was a multicomponent site, with the Owl Hollow and Mississippian components predominating. Large scale excavations were conducted during the summer and autumn of 1973.

Site 40CF111 was situated on the first terrace at the northeastern end of a long river bend adjacent to the steep, left descending bank of the Duck River. This terrace overlooked the broad, low river flood plain contained within the river bend. Site 40CF108 was found at the opposite end of this same river bend. The river valley floor, where 40CF111 is located, is within the Nashville

Basin, while the surrounding ridges are part of the Eastern Highland Rim. The exact map location of 40CF111 is 35° 28' 12" north latitude and 86° 14' 23" west longitude. Site elevation ranged between 819.0 and 820.8 ft AMSL. Armour silt loam is the primary soil type on this terrace.

A bulldozer and a self loading pan were used to strip the plowzone from the site. Following the removal of the plowzone all features and postholes were marked for future hand excavation. The fill from each feature and posthole was waterscreened through a window screen mesh. Soil samples from features were saved for flotation.

The stripping operation revealed the presence of Structure I, a large (35 ft north-south by 45 ft east-west) double earth oven house characteristic of the Owl Hollow phase. Just north and adjacent to Structure I was a large black midden which was probably formed by the repeated dumping of refuse from the Structure I earth ovens and other day to day activities. Cobb (1978) determined that there were at least 21 Owl Hollow features present at 40CF111, ten of which were associated with or very near to Structure I.

The 21 features examined for late Middle Woodland faunal remains were: Features 83, 91, 94, and 100 in excavation Zone I; Features 29, 31, 42, 44, 47, 49, 64, 66, 68, and 69 in excavation Zone II; and Features 34, 78, 89, 95, 102, and 130 in excavation Zone III. The faunal materials recovered from the floor of Structure I were not included in this analysis since the author did not think it was

possible to definitely prove their Owl Hollow origin; numerous Mississippian features and faunal remains were also present at the site.

Middle Woodland features at the Banks V site were divided by Cobb (1978) into six formal types and three subtypes. While faunal remains were recovered from most of these feature types, the majority of the Owl Hollow faunal material was found in the earth oven features (Features 29, 31, 40, 64, and 66), specifically Feature 66 which yielded just over one-half of the site's total skeletal elements. Feature 66 was an earth oven located outside of and 15 ft northwest of Structure I.

The Owl Hollow component at 40CF111 was dated by nine radiocarbon samples, all submitted to the University of Georgia. These samples were obtained from six features and one large posthole (Table 3). Although there were several erratic dates based on these samples (i.e. UGa-1004), the majority fit quite well into the era presumed to be occupied by the Owl Hollow culture, approximately A.D. 200 through A.D. 700 (Cobb and Faulkner 1978). The two dates from Features 29 and 31 in Structure I have an average date of A.D. 425. Based on these dates, Cobb (1978) feels that Structure I was roughly contemporaneous to Structures III and IV at 40CF108 (their average ages are respectively A.D. 485 and A.D. 430) and Structure III at 40CF32 (A.D. 465). All these structures fit into the middle portion of the Owl Hollow chronology (A.D. 400-600) (Cobb and Faulkner 1978). Cobb and Faulkner (1978) believe that 40CF111 was occupied most intensively during the middle Owl Hollow period.

Table 3

40CF111 Radiocarbon Dates

Feature No.	Sample No.	Dates
Feat. 40	UGa-723	1290 ± 160 B.P. (A.D. 660)
Feat. 64	UGa-645	1245 ± 80 B.P. (A.D. 525)
Feat. 64	UGa-1004	1905 ± 165 B.P. (A.D. 45)
Feat. 66	UGa-646	1380 ± 95 B.P. (A.D. 570)
Feat. 66	UGa-721	1515 ± 65 B.P. (A.D. 435)
Feat. 130	UGa-727	1665 ± 85 B.P. (A.D. 285)
P.H. 557	UGa-722	1710 ± 75 B.P. (A.D. 240)
Structure I		
Feat. 29	UGa-643	1555 ± 70 B.P. (A.D. 395)
Feat. 31	UGa-644	1495 ± 65 B.P. (A.D. 455)

A total of 3,035 bones and bone fragments was recovered from the 21 Owl Hollow features at 40CF111 (Table 4). Of this total only 161 fragments were identifiable to at least the order level. Mammals, with 81 identifiable bone fragments, were the most abundant group in the faunal sample (50.26% of all identifiable bone). They were also obviously the most important group in the Owl Hollow diet; mammals make up 94.18% of the estimated pounds of meat available for consumption at 40CF111.

The remains of at least 12 species of mammals were recovered from 40CF111. Not all of these should be considered potential food resources. Many of the smaller rodents may be natural inclusions at the site; these include the eastern chipmunk, white-footed mouse, rice rat, hispid cotton rat, southern bog lemming, pine vole, and mouse spp. Also, a human incisor was found mixed with the faunal material from Feature 29 in Structure I. Of those mammals considered to have been food resources, the white-tailed deer was obviously the most significant since it made up 73.39% of the total estimated pounds of meat available for consumption at 40CF111. The opossum, raccoon, gray/fox squirrel, and eastern cottontail rabbit would have been important dietary supplements.

Birds do not appear to have played a significant role in the late Middle Woodland diet at 40CF111, only four indeterminate bird bone pieces were recovered from the 21 Owl Hollow features. Reptile remains, however, were much more numerous with 77 identifiable pieces (47.80% of the total identifiable bone) recovered. In spite of their

Table 4

Vertebrate Fauna Identified from the Banks V Site (40CF111)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Opossum, *Didelphis marsupialis*	2	1	1.24	8.50	6.23
Raccoon, *Procyon lotor*	3	1	1.86	17.50	12.84
Eastern Chipmunk, *Tamias striatus*	1	1	.62	-	-
Gray/Fox Squirrel, *Sciurus* spp.	3	1	1.86	.60	.44
cf. White-footed/Deer Mouse, *Peromyscus* sp.	1	1	.62	-	-
Rice Rat, *Oryzomys palustris*	3	1	1.86	-	-
Hispid Cotton Rat, *Sigmodon hispidus*	5	1	3.10	-	-
Southern Bog Lemming, *Synaptomys* cf. *cooperi*	2	1	1.24	-	-
Pine Vole, cf. *Microtus pinetorum*	2	1	1.24	-	-
Mouse spp.	37	2	22.98	-	-
Small Rodents spp.	4	1	2.48	-	-
Eastern Cottontail, *Sylvilagus floridanus*	3	1	1.86	1.75	1.28
White-tailed Deer, *Odocoileus virginianus*	8	1	4.96	100.00	73.39

Table 4 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
cf. White-tailed Deer, *Odocoileus virginianus*	6	-	3.72	-	-
Human, *Homo sapiens*	1	1	.62	-	-
Total Ident. Mammal Bone Pieces	81	15	50.26	128.35	94.18
Indet. Mammal Bone Pieces	2,863				
Total Mammal Bone	2,944				
Birds					
Indet. Bird Bone Pieces	4				
Total Bird Bone	4				
Reptiles					
Snapping Turtle, *Chelydra serpentina*	1	1	.62	7.50	5.50
Stinkpot, *Sternotherus* cf. *odoratus*	4	1	2.48	-	-

Table 4 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Eastern Box Turtle, *Terrapene carolina*	11	1	6.83	.40	.29
cf. Eastern Box Turtle, *Terrapene carolina*	3	-	1.86	-	-
Turtle, spp.	35	-	21.73	-	-
Snake, spp.	23	1	14.28	-	-
Total Ident. Reptile Bone Pieces	77	4	47.80	7.90	5.79
Amphibians					
Frog/Toad spp.	2	1	1.24	-	-
Total Ident. Amphibian Bone Pieces	2	1	1.24	-	-
Fish					
Gar, *Lepisosteus* sp.	1	1	.62	-	-
Total Ident. Fish Bone Pieces	1	1	.62	-	-

Table 4 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Indet. Fish Bone Pieces	7				
Total Fish Bone	8				
Total All Ident. Bone	161	21	99.92	136.25	99.97
Total All Indet. Bone	2,874				
Total All Bone	3,035				

numerical abundance in the bone sample, reptiles make up only a very small percentage of the estimated pounds of meat available for consumption. It is believed that they would have been only minor dietary supplements.

There were at least three species of turtles and one snake represented in the 40CF111 material. Two of the turtles were aquatic (snapping turtle and stinkpot) and the third was terrestrial (eastern box turtle). As stated previously, the snapping turtle and the stinkpot were probably taken in nets while fishing or when the females were out of the water to lay eggs. The box turtle is commonly seen wandering in wooded areas and is quite docile and easily picked up. At least 23 species of snakes are known to occur within the vicinity of 40CF111 (Appendix A) and any of these could have been utilized as a meat resource.

Amphibian and fish remains were also quite scarce in Owl Hollow features at 40CF111. Only two fragmentary amphibian remains were recovered and these could be identified only as Frog/Toad spp. Of the eight fish remains found at the site, only one could be identified to the generic level. This was a gar jaw fragment from Feature 66.

The paucity of fish remains at 40CF111 is rather surprising since, as will be seen later, fish remains were quite common at other Owl Hollow sites and often made up a large portion of the faunal sample. Sampling problems, or more likely poor preservation of bone materials, are felt to be the reason for this situation at 40CF111.

Fish bone is often rather delicate and deteriorates rapidly. Site seasonality may also have been a factor; fishing activities were probably less frequent during the winter months.

Few invertebrate remains were recovered from 40CF111. Bivalve fragments from indeterminate mussel species were found in Features 29, 44, 49, and 66. One Marginella sp. shell bead was found in Feature 66. Marginella is a genus of marine gastropod found on the Gulf and Atlantic coasts as far north as North Carolina (Morris 1956). Historically Marginella shells were common trade items in the Southeast, where they were used as beads for necklaces.

Cobb (1978) suggests a year round occupation of 40CF111, with the most intensive occupation occurring during the winter. The earth oven house and the preponderance of charred hickory nuts (Carya spp.) in the features are used to support site occupation during the autumn and winter months. Squash (Cucurbita pepo) and chenopodium (Chenopodium spp.) remains from the features substantiate a late summer and autumn occupation, while grape (Vitis spp.) remains show utilization during the summer (cf. Crites 1978a). The majority of the animal groups noted in the Owl Hollow component would have been available the year round (mammals, birds, and fish), with the exception of the reptiles. While aquatic turtles are often active during cooler periods, snakes and the eastern box turtle are abroad only during the late spring, summer, and early autumn months.

The Eoff I Site (40CF32)

Eoff I was a multicomponent site situated in the lower Normandy Reservoir near the confluence of Carroll Creek and the Duck River. Evidence of Middle and Late Archaic, McFarland, Owl Hollow, and Mississippian cultural components was found at the site. The latter three components were best represented. This site was located at the transition between the upper and lower reservoir zones; no Owl Hollow sites were found within the upper portion of the reservoir. Site 40CF32 was situated on a large, slightly rolling first terrace, and its elevation varied between 835 and 848 ft AMSL. Armour silt loam was the predominant soil type.

Test excavations were conducted at 40CF32 in 1972 and 1973. In the summer of 1975, power equipment was used to strip the plowzone from 25 acres of the site. Numerous features, postholes, and house patterns were exposed. Mississippian and McFarland features were most common at the site, but the Owl Hollow component was represented by at least 19 features and numerous posthole alignments. Cobb (1982) feels that there were potentially two Owl Hollow winter earth lodges and ten summer structures present at the site. Based upon the radiocarbon and archaeomagnetic dates, Cobb (1982) believes that there may have been two discrete Owl Hollow occupations at 40CF32, the first at approximately A.D. 415 and the second at approximately A.D. 586. One of the earth oven houses (Structure III) and a majority of the summer structures are believed to be associated with

the first occupation. The second occupation was contiguous with an earth oven complex and is believed to have occupied the site predominately during the winter months (Cobb 1982).

All feature material was water screened, generally through a window screen (1x1.5 mm) mesh. A 2.5 gallon bucket of fill was retained for water flotation from those features which contained large amounts of plant and animal remains.

Three radiocarbon dates and six archaeomagnetic dates were obtained from Owl Hollow features at 40CF32 (Tables 5 and 6). The radiocarbon dates were calculated by the University of Georgia, while the archaeomagnetic materials were processed by the Earth Sciences Observatory, the University of Oklahoma. Features 34 and 92, each an earth oven, were dated using both methods. As can be seen in Tables 5 and 6, the dating results obtained by the two methods are not as close as might be expected or desired. The Feature 34 radiocarbon date is A.D. 465 ± 60 years, while the archaeomagnetic date is A.D. 300, a difference of 165 years. Feature 92 has a radiocarbon date of A.D. 385 ± 55 years and an archaeomagnetic date of A.D. 575 ± 34 years, 190 years difference.

In calculating the archaeomagnetic date for Feature 34, difficulties were encountered with the sample. These difficulties necessitated a second run of the sample and prevented a standard deviation from being assigned to the sample. Cobb (1982) for this reason feels that the archaeomagnetic date of A.D. 300 is too early and that the radiocarbon date of A.D. 465 is more correct. The

Table 5

40CF32 Radiocarbon Dates

Feature No.	Sample No.	Dates
Feat. 34	UGa-1304	1485 ± 60 B.P. (A.D. 465)
Feat. 92	UGa-1305	1565 ± 55 B.P. (A.D. 385)
Feat. 801	UGa-2505	1555 ± 75 B.P. (A.D. 395)

Table 6

40CF32 Archaeomagnetic Dates

Feature No.	Lab No.	Sample No.	Dates
Feat. 19	1273	11-11-75 NRC	A.D. 625 ± 25
Feat. 32	1280	11-16-75 NRC	A.D. 565 ± 29
Feat. 34	1278	11-15-75 NR	A.D. 300 ± (?)
Feat. 92	1275	11-12-75 NR	A.D. 575 ± 34
Feat. 93	1271	11-10-75 NR	A.D. 530 ± 20
Feat. 116	1274	11-11-75 NR-1	A.D. 580 ± 44

opposite is the case for Feature 92, where the radiocarbon date is early and the archaeomagnetic date is later. In this case, based upon other site chronometric data, Cobb (1982) believes that the later date, A.D. 575, is the more correct. Eoff I appears to date to the middle of the Owl Hollow period (A.D. 400 - 600) and is roughly contemporaneous with the occupations found at 40CF108 and 40CF111.

Only 603 bone fragments were recovered from eight Owl Hollow features at 40CF32 (Table 7). Cobb (1982) reported 598 faunal remains from these features, but he inadvertently omitted five indeterminant large mammal bone pieces from Feature 93. Field records note that extremely deteriorated bone was found in five additional features and nine postholes. Bone preservation in the 40CF32 Middle Woodland features was very poor, most likely due to the acidic soils at the site.

Four of the eight features containing faunal remains were earth ovens, two (Features 33 and 34) were within Structure III and two (Features 19 and 93) were associated with the later earth oven complex. Nearly 72% of the total Owl Hollow faunal remains was recovered from Feature 33 (136 bone fragments) and Feature 34 (298 bone fragments). As suggested by Cobb (1982), the large amounts of limestone in these features and the calcined condition of many of the bone fragments may have contributed to their preservation.

Only 13 of the 603 bone fragments recovered were identifiable to at least the order level. With such a small bone sample, few if any conclusions may be made about faunal exploitation patterns. As might

Table 7

Vertebrate Fauna Identified from the Eoff I Site (40CF32)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Small Rodent sp.	1	1	7.69	-	-
White-tailed Deer, *Odocoileus virginianus*	5	2	38.46	200.00	99.25
Total Ident. Mammal Bone Pieces	6	3	46.15	200.00	99.25
Indet. Large Mammal Bone Pieces	12				
Indet. Small Mammal Bone Pieces	555				
Total Mammal Bone	573				
Birds					
Indet. Bird Bone Pieces	1				
Total Bird Bone	1				

Table 7 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Reptiles					
Turtle: Graptemys/ Chrysemys spp.	7	1	53.84	1.50	0.74
Total Ident. Reptile Bone Pieces	7	1	53.84	1.50	0.74
Fish					
Indet. Fish Bone Pieces	22				
Total Fish Bone	22				
Total All Ident. Bone	13	4	99.99	201.50	99.99
Total All Indet. Bone	590				
Total All Bone	603				

be expected, the 573 mammal bone fragments made up a majority of the faunal sample (95.02% of the total bone recovered). Only five identifiable fragments of deer bone were recovered from the features, representing a minimum of two individuals. The 200 pounds of meat potentially available from these two animals made the white-tailed deer by far the most significant meat resource present in the faunal sample. The indeterminant small rodent was most likely of natural occurrence at the site.

In his discussion of the Owl Hollow faunal remains from 40CF32, Cobb (1982) stated that small mammals made up a majority of the faunal sample. This statement is, in part, a misunderstanding of the analysis category: Indeterminant Small Mammal Bone Pieces. Cobb assumed that these mammal bone fragments were only from mammals no larger than a fox. As stated earlier in this study, indeterminant small mammal bone pieces were those unidentifiable bone fragments obviously from small mammals such as foxes, raccoons, rabbits, and squirrels or from mammal bones fragmented into such small pieces that it was impossible to speculate on the size of the animal from which they originated. The 40CF32 Owl Hollow bone sample was extremely fragmented and poorly preserved. Large mammals could have been more heavily utilized than indicated by the identifiable remains.

Much of the bone appears to have been purposely broken into small fragments. Cobb (1982) was probably correct in his assumption that large mammal long bones were purposely fragmented to extract the bone grease by boiling. Generally only the compact ends of long

bones remain intact, the diaphyses have been smashed to boil the grease from the fragments (Binford 1981). As will be seen throughout this study this is a common pattern. Indeterminate large mammal bone pieces are always greatly outnumbered by indeterminate small mammal bone pieces.

Only indeterminate bird and fish bones were present in the sample, but neither in appreciable numbers. Amphibians were totally absent and reptiles were represented by seven carapace fragments from a turtle classified as Graptemys/Chrysemys spp. Small numbers of badly decomposed, unidentifiable freshwater snail shells were noted in several of the features.

Due to the small size of the sample it is possible to make only a few tentative observations about the 40CF32 Owl Hollow faunal utilization patterns. Later in this study these observations will be compared to the results obtained from the other Owl Hollow sites. Deer were represented by five elements at 40CF32 and appear to be the principal meat resource. Based upon the diverse elements recovered (2 scapulae, a humerus, an astragulus, and an occipital) the entire animal seems to have been returned to the camp. Birds appear to have played only a minor role in the diet, based on the single indeterminate bird skeletal element recovered. Aquatic faunal resources, however, are more common (the remains of fish, an aquatic turtle, and aquatic mollusks were present) and would appear to have been used at least as dietary supplements. All these faunal resources could have been obtained from environmental settings near the camp.

By themselves the faunal remains do little to indicate the seasonal occupation of the site. Most of the identifiable fauna would have been available the year round; only the Graptemys/ Chrysemys remains could be considered seasonal indicators. These aquatic turtle genera are not, however, very sensitive indicators; individuals of map, painted, and red-eared turtles have been reported as being active during all but the very coldest winter months.

For 40CF32 the structure types and botanical remains supply more reliable seasonal indicators. There were potentially two Owl Hollow winter earth oven lodges and 10 summer structures at 40CF32 (Cobb 1982). The floral evidence consists primarily of mast crops which ripen in the autumn, these include: hickory nuts, acorns (Quercus spp.), and walnuts (Juglans nigra). Grapes would have been available in the summer (Cobb 1982). Some of the most significant floral remains recovered from this cultural component include maize (Zea mays), sunflower (Helianthus annuus), and squash. The presence of these domesticates adds credence to the hypothesis that the site was occupied during the spring and summer months. Although the sunflower and squash can generally be left untended after planting and harvested later, maize, to be grown successfully requires considerable tending and guarding to keep animals out.

The Raus Site (40BD46)

The Raus site is located in Bedford County, Tennessee, at the confluence of Bennett Branch and Thompson Creek (Figure 2). This is

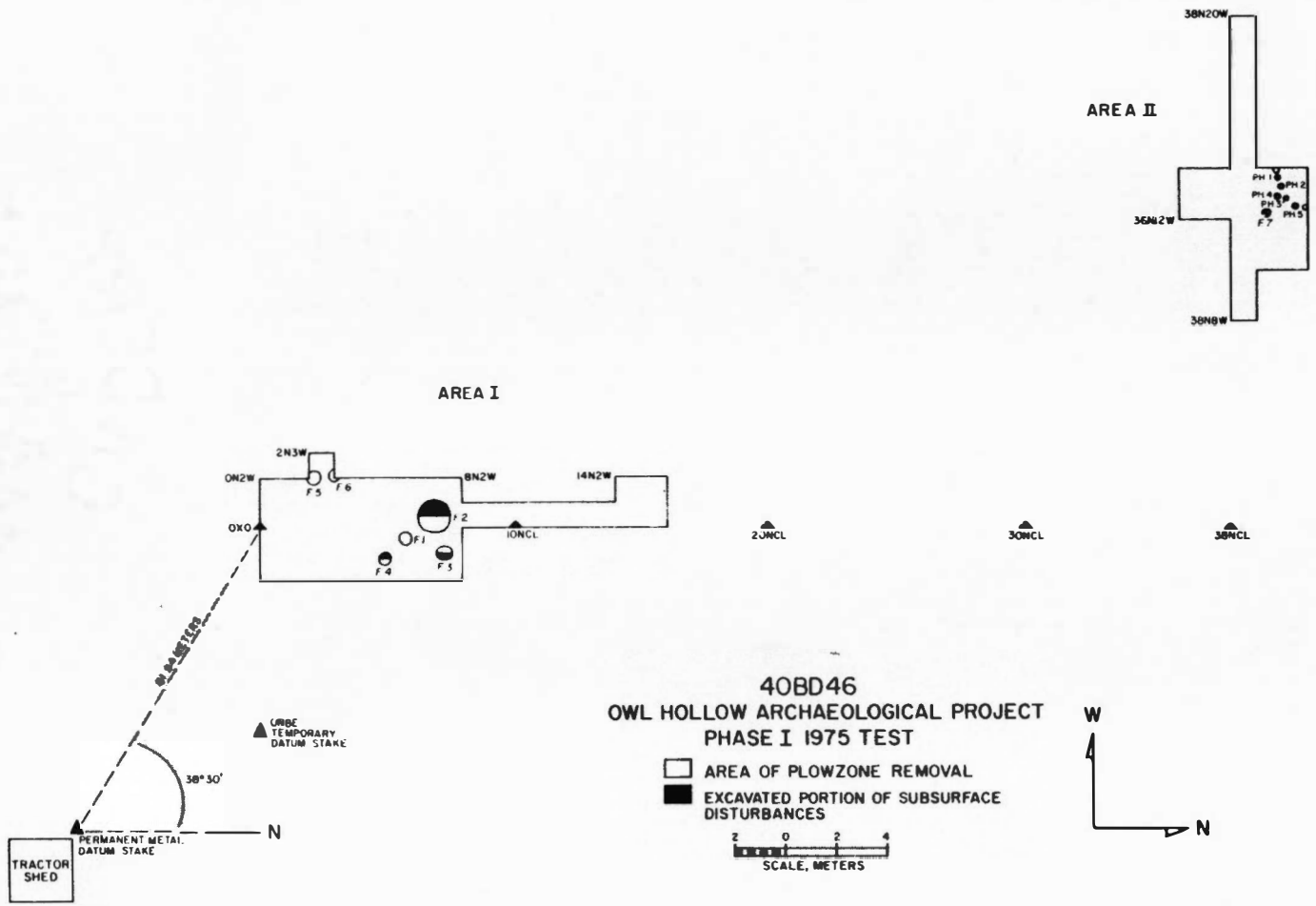

Figure 2. 40BD46. Phase I 1975 test excavations.

approximately 10 miles southwest of the Duck River, at coordinates 35° 24' 05" north latitude and 86° 19' 52" west longitude. Site 40BD46 lies on the east side of Thompson Creek on the first terrace and occupies an area approximately 400 ft north-south by 200 ft east-west. The limits of the site are delineated by concentrations of occupational debris and dark midden soils (Cobb and Faulkner 1978). Strickland et al. (1974) identify the soil at the Raus site as a Mercer silt loam, a slightly acid topsoil, with poor to fair qualities for crop lands by today's standards.

Site 40BD46 is situated in the Nashville Basin on the last extensive Thompson Creek terrace formation prior to ascending the Eastern Highland Rim. Surface elevation of 40BD46 is 840-850 ft AMSL. The nearby Eastern Highland Rim lies to the east and south of the site and reaches levels of 900-1,000 ft AMSL. Inhabitants of the Raus site could easily have exploited the varied resources from the Nashville Basin and the nearby dissected Highland Rim and the flat Highland Rim (the Barrens). While many riverine resources would have been available from Thompson Creek, it is possible that they may also have occasionally utilized plants and animals from the Duck River, 10 miles to the north.

Although the Raus site has been plowed and may have suffered some erosion over the last 100 years, the intact lower portions of many features and a refuse midden that is 49 cm thick in places underlie the plowzone. Along the south and east margins of the site are located two houses, a general store, and a tractor shed.

Excavation was started at the Raus site on December 10, 1975. Based upon the abundance of surface material, two portions of the site were chosen for extensive testing and were designated Area I and Area II (Figure 2). At first, five 2x2 meter (m) test units were intuitively placed in Area I along the southeast margin of the terrace. Later, a one-meter wide strip trench was situated so as to intersect within the first five units. The trench was expanded in those areas displaying subsurface activity. A 1x8 m strip trench was initially opened in Area II and was later expanded 4 m north-south when removal of the plowzone revealed a well preserved, organically rich, black midden.

As previously described, all feature fill and midden soil were screened through 1/4 in hardware cloth or hand sorted when the soils proved too wet to pass through the screen. The land owner would not allow waterscreening. A two and one half gallon bucket of soil was saved from most features and midden levels for flotation in the laboratory.

Seven probable features were identified at 40BD46; numbers 1-6 were in Area I and number 7 was in Area II. Feature 7 was completely excavated but contained no culturally diagnostic material. Features 2, 3, and 4 were bisected, and Features 1, 5, and 6 were mapped but not excavated. Adverse weather conditions did not allow more extensive sampling of these features in the time allotted. Cobb and Faulkner (1978) hypothesized that Feature 2, a shallow, basin-shaped installation, was a crematory facility. To the east and south of

Feature 2 were Features 1, 3, and 4. Features 3 and 4 were small pits containing redeposited cremations, and Feature 1 almost certainly served the same function. The functions of the other three features are unknown.

A stratified, organically rich refuse midden (49 cm thick) was found in Area II. Numerous faunal remains were mixed with the burned pieces of limestone and fragments of charcoal in the four levels of midden. Seven possible postholes were noted in the yellowish gravelly subsoil. Five of these were excavated and found to have a mean diameter of 15 cm and a mean depth of 20 cm. The seven postholes were arranged in an arc and are thought to possibly be part of an outside wall of an Owl Hollow winter house. It is believed that the midden with its numerous pieces of limestone, charcoal, and ash most likely represents fill emptied from earth ovens, possibly thrown against the outside of the winter house for added insulation (Cobb and Faulkner 1978).

A single radiocarbon sample from 40BD46 was submitted to the University of Georgia (UGa-1340). This sample was from the midden in Area II, unit 38Nx14W, level IV. A date of A.D. 615 ± 60 years (1335 ± 60 B.P.) was obtained from this sample (Cobb and Faulkner 1978). The Raus site thus fits into the late period of Owl Hollow development (post A.D. 600).

Nearly 100% of the faunal sample was recovered from Area II, the midden; only a single indeterminate small rodent bone was found in Area I. Although the midden was stratified, the faunal remains and

species within it did not seem to be distributed in any discernable pattern. Therefore, the midden faunal sample, because of its small size (1,447 total bones and bone fragments) and lack of discernable distribution patterning, has been treated as a single sample.

Of the 1,448 bones and bone fragments that were recovered from 40BD46, only 218 were identifiable to at least an order level (Table 8). Vertebrate classes represented in the sample include mammals, birds, reptiles and fish; no amphibian skeletal elements were encountered. Mammal bone, with 1,233 pieces, made up the vast majority of the vertebrate faunal sample (85.15% of the total bone). The 38 pieces of fish bone, on the other hand, made up only 2.62% of the vertebrate material. Fish bone is thought by the author to be under-represented in the faunal sample. Casteel (1972) has shown that most fish bone is small enough to fall through the sort of 1/4 inch hardware cloth used for the dry screen.

At least 10 species of mammals are represented in the faunal sample. The white-tailed deer, with 62 skeletal elements, made up 68.13% of the identifiable mammal remains. There was a minimum of four individual deer in the faunal sample. The white-tailed deer is believed to have been the most important meat resource exploited by the Owl Hollow peoples at 40BD46.

The second most numerous mammal remains (14 skeletal elements) are from the eastern chipmunk. It should be noted, however, that these were all found together and almost certainly represent the remains of a single individual that died naturally in its burrow.

Table 8

Vertebrate Fauna Identified from the Raus Site (40BD46)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Opossum, *Didelphis marsupialis*	1	1	.45	8.50	1.66
Raccoon, *Procyon lotor*	1	1	.45	17.50	3.42
Striped Skunk, *Mephitis mephitis*	1	1	.45	5.00	.97
Domestic Dog, *Canis familiaris*	1	1	.45	8.50	1.66
Woodchuck, *Marmota monax*	2	1	.91	5.60	1.09
Eastern Chipmunk, *Tamias striatus*	14	1	6.42	-	-
Gray/Fox Squirrel, *Sciurus* spp.	5	1	2.29	.60	.11
Beaver, *Castor canadensis*	2	1	.91	38.50	7.52
Small Rodents spp.	2	1	.91	-	-
White-tailed Deer, *Odocoileus virginianus*	62	4	28.44	400.00	78.21
Total Ident. Mammal Bone Pieces	91	13	41.68	484.20	94.64

Table 8 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Indet. Large Mammal Bone Pieces	201				
Indet. Small Mammal Bone Pieces	941				
Total Mammal Bone	1,233				
Birds					
Turkey, *Meleagris gallopavo*	5	2	2.29	17.00	3.32
Total Ident. Bird Bone Pieces	5	2	2.29	17.00	3.32
Indet. Bird Bone Pieces	55				
Total Bird Bone	60				
Reptiles					
Snapping Turtle, *Chelydra serpentina*	1	1	.45	7.50	1.46

Table 8 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Box Turtle, *Terrapene carolina*	74	3	33.94	1.20	.23
Turtle: *Graptemys*/ *Chrysemys* sp.	1	1	.45	1.50	.29
Turtle, spp.	34	-	15.59	-	-
Snake: Colubridae	3	1	1.37	-	-
Snake, spp.	4	-	1.83	-	-
Total Ident. Reptile Bone Pieces	117	6	53.63	10.20	1.98
Fish					
Minnow spp., Cyprinidae	2	1	.91	-	-
Sunfish spp., Centrarchidae	2	1	.91	-	-
Walleye/Sauger, *Stizostedion* sp.	1	1	.45	-	-
Total Ident. Fish Bone Pieces	5	3	2.27	-	-
Indet. Fish Bone Pieces	33				
Total Fish Bone	38				

Table 8 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent of Total Meat
Total All Ident. Bone	218	24	99.87	511.40	99.94
Total All Indet. Bone	1,230				
Total All Bone	1,448				

The remaining mammal species were each represented by five or less skeletal elements. Although the indeterminate small rodent elements were probably natural inclusions at the site, the other species may have been important dietary supplements. Several, such as the raccoon and beaver, would have contributed considerable amounts of meat to the diet.

It is unknown whether the dog was used as a food resource; no butchering cut marks were found on the element recovered. Dogs were, however, obviously allowed to scavenge a part of their food from the scraps thrown in the midden area; several indeterminate large mammal bone fragments and the distal end of a white-tailed deer humerus recovered from the midden displayed evidence of dog gnawing.

Of the 60 bird skeletal fragments, only five were identifiable and all these were from the turkey. A minimum of two turkeys was represented in the collection.

The 117 identifiable reptile skeletal fragments present in the faunal sample constituted 53.63% of all identifiable vertebrate remains. At least three species of turtle and one snake were represented. The box turtle was most numerous with 74 skeletal fragments from at least three individuals. Single skeletal elements from the snapping turtle and Graptemys/Chrysemys sp. were recovered. With the exception of the snapping turtle, only small amounts of meat would have been available from most of the species present.

There were no amphibian and only 38 fish skeletal remains found in the 40BD46 faunal sample. The five identifiable fish remains were identified as minnow spp., sunfish spp., and walleye/sauger sp.

Nineteen identifiable freshwater snails were recovered from the excavations at the Raus site (Table 9). All 19 were from the midden; seven from excavation level 3 and 12 from excavation level 4. There were three pleurocerids represented in the sample, Lithasia armigera form duttoniana, Pleurocera canaliculatum and Goniobasis laqueta/edgariana. Pleurocerid snails are most commonly found in clear, swiftly running water in shallow riffle areas where they cling to stones and cobbles. Each of the three species found at 40BD46 could easily have been collected from shallow water areas in nearby Thompson Creek. Only high water conditions would have prevented the collection of freshwater snails.

Judging from the recovered faunal sample it would appear that mammals, and especially the white-tailed deer, were the most important meat resources for the inhabitants of 40BD46. Birds, reptiles, fish, and freshwater snails would appear to have supplied only supplemental protein to the diet.

Only two of the animals represented at the site may be considered good indicators of site seasonality; these are the box turtle and the snake. Both of these reptiles are active only during the warm weather months; each hibernates during the winter. The mammal, bird, and fish species in the faunal sample would have been available for exploitation the year round. Both aquatic turtles are reported to be active during all but the coldest days of the year in this region.

Other site seasonal indicators include floral remains and the

Table 9

Freshwater Gastropoda from the Raus Site (40BD46)

Species	Pieces	MNI	Percent Of Total
Freshwater Gastropods			
Lithasia armigera form *duttoniana*	1	1	5.26
Pleurocera canaliculatum	8	8	42.10
Goniobasis laqueta/edgariana	10	10	52.63
Total Ident. Freshwater Gastropods	19	19	99.99

burned limestone refuse and postholes found in the midden. Cobb and Faulkner (1978) believe that the postholes are part of the outer wall of a winter earth oven lodge. The burned limestone and ash in the midden are thought to be waste from earth ovens that was dumped against the outer wall of the winter lodge to help insulate the structure.

Floral materials from the site include the remains of hickory nuts, walnuts, acorns, goosefoot (Chenopodium spp.), pigweed (Amaranthus spp.), and knotweed (Polygonum spp.), all of which can be gathered for consumption during the autumn of the year. Domestic crop remains found at the site include squash and maize which ripen in the late summer and early autumn. Maygrass (Phalaris caroliniana) was also present and would generally have been utilized in the late spring and early summer months (Crites 1978a). The seasonal indicators present at the site suggest that it was occupied for the entire year by at least a part of the population.

Two of the identifiable bone fragments from this site had noticeable butchering cuts. A left distal humerus of a white-tailed deer had heavy butchering marks on the medial side of the bone just above and on the articular condyle. The cuts are perpendicular to the long axis of the bone. These cuts would have been made when separating the ulna and radius from the humerus. This is a tight joint and considerable effort is usually needed to separate the elements. This humerus also displays the deep pitting usually associated with dog gnawing.

The second bone with evidence of butchering cuts is a right humerus shaft from a turkey. The cut marks are located on the medial side of the bone just below the head of the humerus. Cuts of this type would have been made while separating the bird's wing from the body.

Thirteen worked bone pieces were recovered from 40BD46. One of these was a bird bone and the others were portions of mammal elements. All but one of these altered bone pieces were from a single 2x2 meter square in the midden deposit. One worked bone element was recovered from Level II, six from Level III and five from Level IV. The only other worked bone element from 40BD46 was found in Level I of midden unit 38N12W.

Four bone needles and one possible needle shaft fragment were recovered from 40BD46. All were made from large mammal long bone splinters. One of the needles, a proximal fragment with a complete eye, was found in Level II of 38N14W (Figure 3a). The eye of this needle fragment was made by drilling the bone shaft from opposing sides. A depression found at the top of the needle, on one side just above the complete eye, appears to have been caused by an earlier unsuccessful attempt to drill an eye. Although the fragment is highly polished, a number of deep grinding marks can be found randomly scattered over the surface of the piece.

A nearly complete needle and a probable needle shaft fragment were recovered from Level III of unit 38N14W. The nearly complete needle is missing only the very tip of its distal end and the top

Figure 3. 40BD46. A-D. Bone needles and needle fragments. E-F. Bone splinter awls.

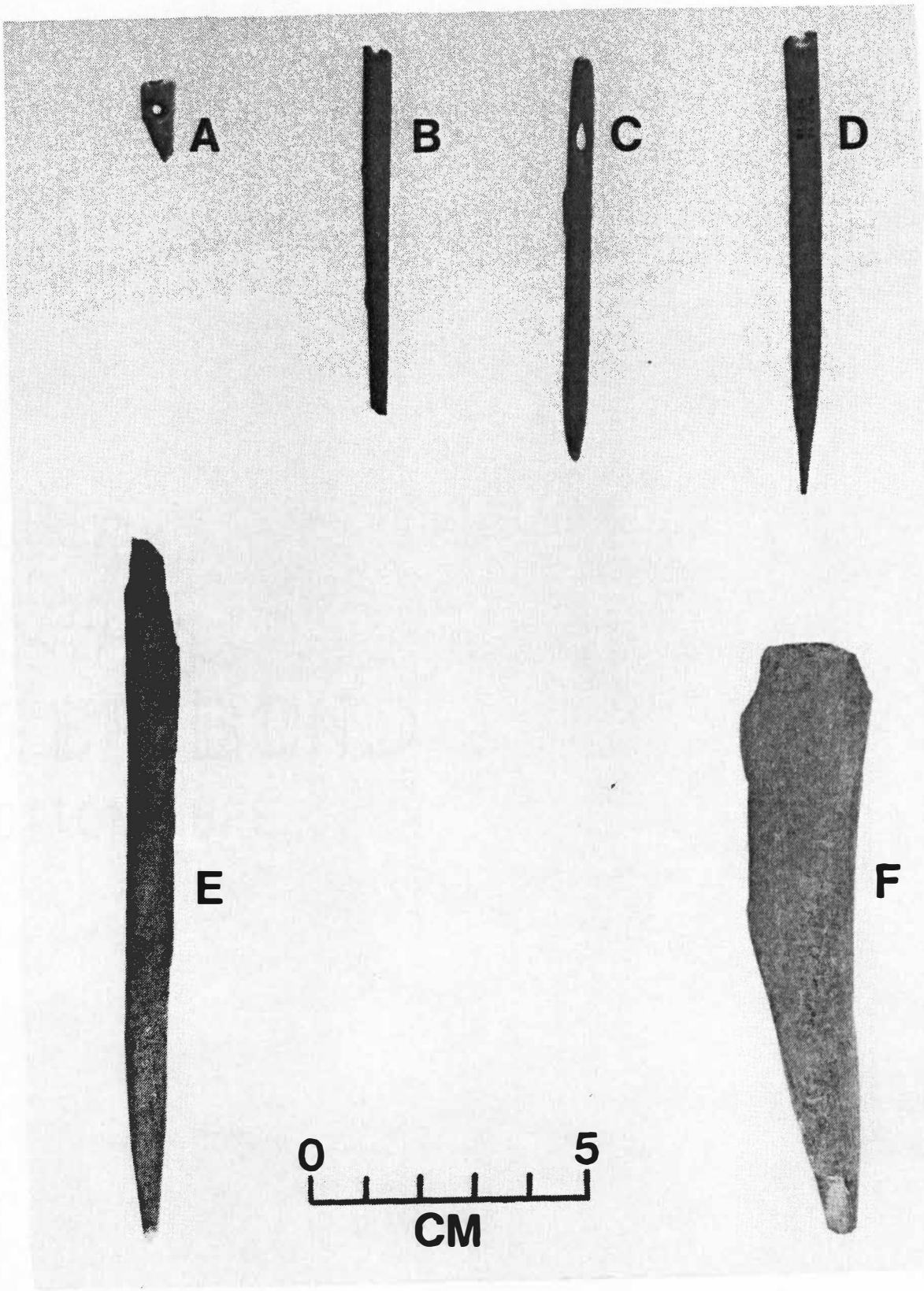

Figure 3.

half of the eye (Figure 3b). The portion of the needle nearest the eye has a rather flattened cross-section, but at its distal end the piece is more rounded. The needle appears to have been darkened before it was polished, possibly by charring it slightly. A number of abrasion marks are still present on the tool, most running lengthwise down the shaft. The needle eye was made by drilling the piece from opposing sides.

The probable needle shaft has had both its distal and proximal ends broken away, making an exact functional identification impossible. However, based upon its overall shape and method of manufacture, the piece was most probably part of a needle. The fragment is highly polished and slightly burned on one end. Numerous slight striations, caused by abrasion during the manufacturing process, run lengthwise down the tool.

Two needles were found in Level IV of unit 38N14W; one was complete and the other was minus only the top of its eye. The complete needle is unusual because of its blunted distal tip (Figure 3c); the distal ends of most other needles have been rather sharp and pointed. Possibly the distal end was at one time broken off and only roughly resharpened. The surface of the needle was highly polished and the eye was produced by what will be referred to as the "scratch technique". Rather than drilling the eye, a small sharp instrument was scratched back and forth on the bone surface, first on one side and then the opposite, until an elongated eye was created.

The second needle from Level IV is missing only the top half of

its eye (Figure 3d). The needle shaft has a rather flattened cross-section, and the surface of the piece has been highly polished. Although broken, it is obvious that the eye was created by drilling the bone shaft from opposite sides.

Two bone splinter awls were recovered from Level IV of 38N14W; both were manufactured from large mammal long bone fragments (Figure 3e and f). The sole alteration to each awl consisted of grinding one end to a point. Wear and polish is observable only on the worked distal ends. A considerable number of deep scratch marks are present on the outer surface of the larger awl.

A small bone rod made from a large mammal long bone splinter was found in Level III of 38N14W (Figure 4a). The outer bone table has exfoliated over a large part of the tool's surface. That portion of the outer surface which still remains, however, bears a number of abrasion marks and some evidence of polish. Both ends of the rod are roughly broken, but whether these breaks are part of the tool makers original design or the result of later use is unknown. Possibly the artifact was a blank prepared for manufacture into a bone needle.

A white-tailed deer first phalange, altered for use as the cup of a cup and pin game, was found in Level III of 38N14W (Figure 4b). The proximal end of the phalange was roughly cut off and the interior of the element was hollowed out. A hole was drilled in the distal end of the phalange so that a cord might be passed through the piece and knotted. The opposite end of the cord could then have been tied to a narrow pointed stick. If this toy was used similarly to those

Figure 4. 40BD46. A. Mammal bone rod. B. White-tailed deer first phalange altered for cup and pin game. C. White-tailed deer left tibia, disal end removed by "groove and snap" method. D. Mammal bone rod.

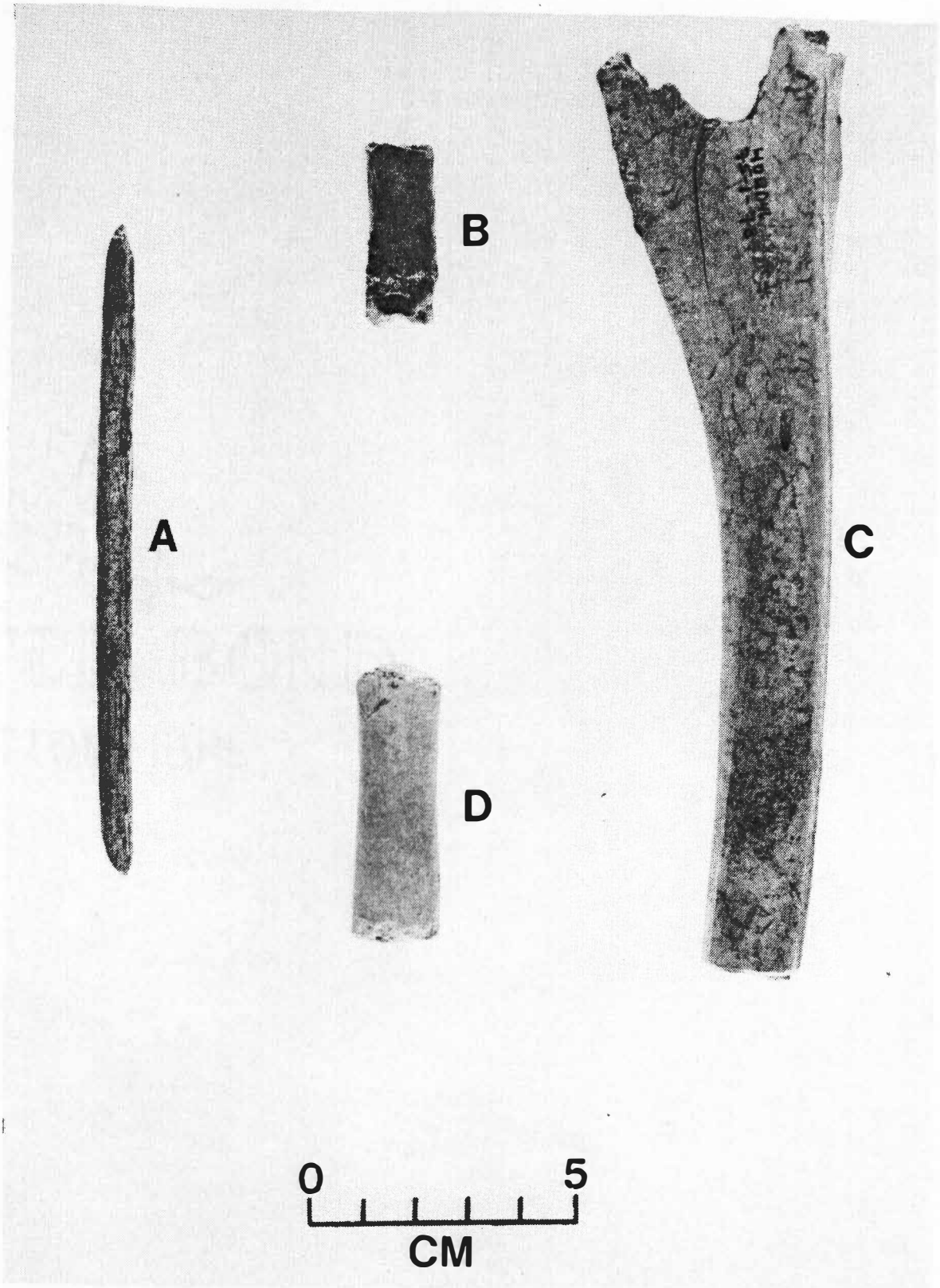

Figure 4.

of historic groups, a player would flip the phalange or cup into the air and then attempt to catch it on the attached stick.

Three additional worked bone elements were found in 38N14W, two from Level III and one from Level IV. One of the worked elements from Level III, a bird bone, appears to be a discard from the "groove and snap" method of removing articular ends of limb bones. The only alteration to this bone consists of a deep ring cut around the entire circumference of the element. After the ring was cut into the bone, the piece was broken or snapped into two parts. The bone was too fragmentary to determine which bird species or even which element was being modified. The second worked element from Level III is a very small flat fragment from a larger tool. Numerous scratch or abrasion marks can be found on the highly polished surface of this small tool fragment.

A worked white-tailed deer left tibia was recovered from Level IV of 38N14W (Figure 4c). The proximal end of this tibia has been roughly broken away and the distal end removed by the "groove and snap" method. Heavy polish, as would result from extensive use, is present on the most distal portion of the cut end. Much of the cancellous bone on the interior of the tibia shaft appears to have been removed. Because of the worn, polished area on the distal end of the bone, a hide or plant processing function might be suggested for the piece. Wear patterns do not indicate that any bone or stone tool was socketed into the cut end.

A flattened, rod shaped artifact made from mammal bone was

recovered from Level I of 38N12W (Figure 4d). The large long bone section used to make this artifact was moderately polished after it was made symmetrical by heavily grinding the sides and rear of the bone. What function this piece served is unknown.

The Shofner Site (40BD55)

The Shofner site is situated at 35° 28' 08" north latitude and 86° 20' 34" west longitude, Bedford County, Tennessee. This location is near the confluence of Thompson Creek and the Duck River, approximately 3,000 ft east of the Duck River and about 300 ft north of Thompson Creek. The site is on the edge of the first terrace of Thompson Creek and measures nearly 300 ft east-west by 150 ft north-south. Surface elevation of 40BD55 varies between 790 ft and 785 ft AMSL. To the north and west of the site there are approximately 300 acres of floodplain and older eroded terraces (760-770 ft AMSL). The eastern margin of the site is marked by an increase in elevation (800-820 ft AMSL) and rolling hills. Strickland et al. (1947) classify the site soil type as a well-drained, medium acidic Cumberland silt loam. The soil type for the rolling hills immediately to the east of 40BD55, however, is a low fertility Colbert silt loam. The Shofner site is located within the Nashville Basin, but outlier hills of the Eastern Highland Rim are present approximately 90 m to the east (Cobb 1985).

It is thought that a major portion of 40BD55 probably lies within Mr. Cecil Shofner's yard, and under his house and nearby

outbuildings (Figure 5). Much of the site may be preserved under the yard and buildings in this farm complex. Archeological testing occurred along the northern margins of the site where it was disturbed by a vegetable garden and soybean field. The Shofner site was tested on two separate occasions, the first in December of 1975 and the second in October of 1979.

For the 1975 test excavations three 2x2 m test units were intuitively placed near concentrations of surface material in the vegetable garden approximately 100 ft west of the Shofner house; an additional 2x2 m test square was excavated in the soybean field approximately 28 m north of the house. In the garden area the test units were connected by one meter-wide strip trenches extending 22 m north-south and 12 m east-west. Portions of these trenches were expanded when subsurface features were encountered.

Four features were discovered during the 1975 excavations. Except for Feature 2, the fill from each was dry screened through 1/4 in hardware cloth and a 2.5 gallon bucket of fill was saved for water flotation with the laboratory flotation device. Features 1, 3, and 4 were relatively shallow, amorphously shaped disturbances of uncertain function. They contained only very small amounts of ecofactual materials. Feature 2, however, was a very substantial facility, nearly circular in plan view, with vertical side walls and a flat base. The mouth of the feature was 135x129 cm and it was 50 cm deep. It contained a total of 1,592.08 pounds of fill, which was removed in separate quadrants and returned to the University of Tennessee for

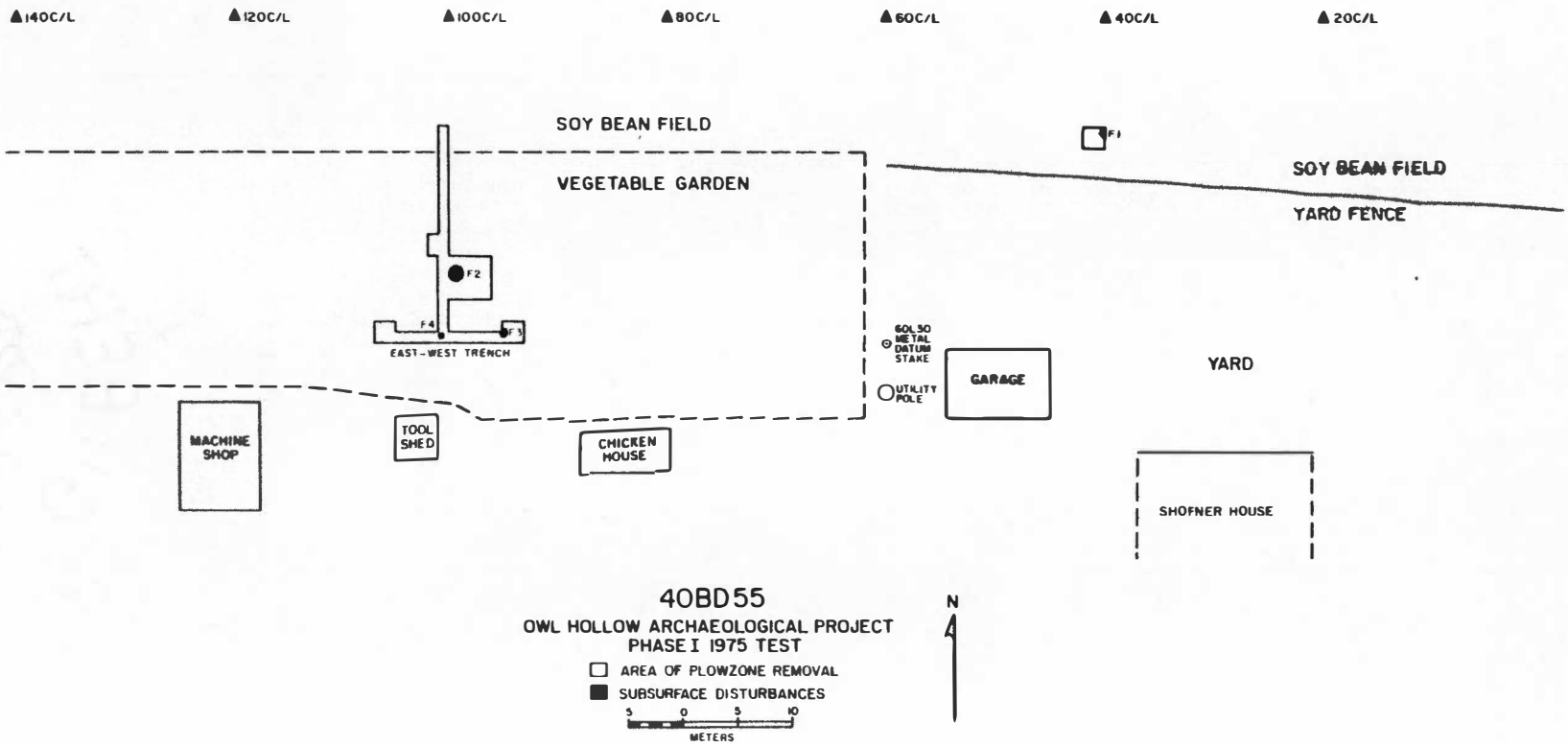

Figure 5. 40BD55. Phase I 1975 test excavations.

flotation. Large amounts of floral and faunal materials were recovered from the feature. Most conspicuous were the freshwater gastropods and pelecypods; approximately 100 pounds of shell were ultimately recovered from flotation of the fill. Cobb and Faulkner (1978) classify Feature 2 as a storage/refuse facility. They believe that its location on the back slope of the first terrace places it on the margin of the main occupational locus, which was thought to be in the Shofner yard.

Additional testing of the Shofner site was carried out in the autumn of 1979. Since the purpose of this testing was to recover ecofactual materials, three 2x2 m units were placed in the midst of surface concentrations of shell. Features 5 and 6 were found immediately behind the Shofner tool shed on the edge of the garden. The two features overlap slightly so the feature fill from the mixed area was kept separate during excavation. Both Features 5 and 6 were large, roughly circular, basin shaped features of unknown function. Feature 5 measured approximately 92x145 cm and 24 cm deep, while Feature 6 was 100x86 cm and 30 cm deep. An additional small, intruding feature (Feature 8) was found on the northern edge of Feature 5 on the last day of excavations, but there was not sufficient time to explore it.

Feature 7 was located along the edge of the soybean field almost immediately north of the Shofner house. When excavated, this feature was found to be a very shallow pit with a rounded base. Feature 7 measured 74x73 cm and was only about 16 cm deep. Small amounts of bone and shell were found throughout the feature fill.

Two radiocarbon determinations were obtained from Feature 2. A large charcoal sample from the northeast quadrant of Feature 2 was sent to the University of Georgia for chronometric analysis. Enough material was available for the radiocarbon laboratory to run a second gratis sample to cross-check their facilities against the first date. The two dates received from this sample, A.D. 565 ± 60 years (UGa-1341, 1385 ± 60 B.P.) and A.D.465 ± 95 years (gratis sample, 1485 ± 95 B.P.), vary by 100 years. Cobb and Faulkner (1978: 12) state: "Although these dates vary by 100 ± years, there is one standard deviation overlap in their range. The variation of the dates is consistent with a sample composition of primarily charred wood fragments." Either date would place 40BD55 into the middle portion of the Owl Hollow cultural continuum (A.D. 400-600) (Cobb and Faulkner 1978).

At 40BD55 faunal remains were recovered from all seven of the excavated features. An extremely wide range of faunal species was found at this site. There were at least 36 species of vertebrates, 23 species of freshwater pelecypods, 7 species of freshwater gastropods, and 26 species of terrestrial gastropods. The overwhelming majority of this material was from Feature 2. Of the total 893 identifiable and 8,646 indeterminate bones recovered from 40BD55, 742 of the identifiable bones (83.09% of the total) and 5,624 of the indeterminate fragments (65.04% of the total) were from Feature 2. Nearly 100 pounds of shell (pelecypod and gastropod), 1,013 fish scale fragments and 25 pieces of bird egg shell were also found in Feature 2.

All vertebrate and pelecypod materials from the seven features were completely examined. However, the freshwater gastropods in Feature 2 and the terrestrial gastropods in Features 2 and 5 were so numerous that it was considered impractical to attempt to examine them all. Subsampling strategies were, therefore, set up to choose representative and manageable samples for examination. These strategies will be discussed in detail later in the text. The freshwater gastropods from all other features were less numerous and were completely examined.

Of the 9,539 bone pieces found in the seven features at 40BD55, 893 were identifiable to at least the order level (Table 10). Mammal bone, with 6,414 pieces, made up a majority of the collection (67.23% of the total). The 226 identifiable mammal bones from the site were from at least 15 different species. Mammals made up 94.81% of the calculable meat weight available from animals represented at the site.

The white-tailed deer was obviously the most important of the animal species in the Indian diet at 40BD55. There were 63 identifiable deer elements in the collection, from a minimum of three adult individuals. No other animal found at 40BD55 has the potential for supplying as much meat as the deer.

Other mammals from 40BD55 considered to be important supplemental food resources include raccoon, striped skunk, gray fox, woodchuck, fox squirrel, gray/fox squirrel, beaver, and cottontail. These species accounted for 22.33% of the total calculable meat

Table 10

Vertebrate Fauna Identified from the Shofner Site (40BD55)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Raccoon, *Procyon lotor*	7	2	.78	35.00	8.22
Striped Skunk, *Mephitis mephitis*	1	1	.11	5.00	1.17
cf. Striped Skunk, *Mephitis mephitis*	1	-	.11	-	-
cf. Gray Fox, *Urocyon cinereoargenteus*	1	1	.11	4.50	1.05
Fox, sp.	1	-	.11	-	-
Domestic Dog, *Canis familiaris*	2	1	.22	8.50	1.99
Dog/Fox, Canidae	5	-	.55	-	-
Woodchuck, *Marmota monax*	2	1	.22	5.60	1.31
Fox Squirrel, *Sciurus niger*	1	1	.11	1.30	.30
cf. Fox Squirrel, *Sciurus niger*	5	-	.55	-	-
Gray/Fox Squirrel, *Sciurus* spp.	28	3	3.13	1.80	.42
Beaver, *Castor canadensis*	2	1	.22	38.50	9.04

Table 10 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Deer Mouse, *Peromyscus* spp.	3	2	.33	-	-
White-footed/Deer Mice, Cricetidae	3	2	.33	-	-
Hispid Cotton Rat, *Sigmodon hispidus*	1	1	.11	-	-
Southern Bog Lemming, *Synaptomys cooperi*	2	1	.22	-	-
Pine Vole, *Microtus pinetorum*	1	1	.11	-	-
Vole sp., *Microtus* sp.	1	1	.11	-	-
Meadow Jumping Mouse, *Zapus hudsonius*	1	1	.11	-	-
Small Rodents spp.	35	-	3.91	-	-
Cottontail, *Sylvilagus* cf. *floridanus*	63	2	7.05	3.50	.82
White-tailed Deer, *Odocoileus virginianus*	59	3	6.60	300.00	70.49
Deer sp., Cervidae	1	-	.11	-	-
Total Ident. Mammal Bone Pieces	226	25	25.21	403.70	94.81
Indet. Large Mammal Bone Pieces	339				

Table 10 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Indet. Small Mammal Bone Pieces	5,849				
Total Mammal Bone	6,414				
Birds					
Bobwhite, *Colinus virginianus*	3	1	.33	.29	.06
Turkey, *Meleagris gallopavo*	11	2	1.23	17.00	3.99
Passerine sp.	3	1	.33	-	-
Total Ident. Bird Bone Pieces	17	4	1.89	17.29	4.05
Indet. Bird Bone Pieces	371				
Total Bird Bone	388				
Reptiles					
Turtle: Kinosternidae	10	1	1.11	-	-
Box Turtle, *Terrapene carolina*	165	4	18.47	1.60	.37

Table 10 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Turtle: *Graptemys*/ *Chrysemys* spp.	21	2	2.35	3.00	.70
Turtle, spp.	155	-	17.35	-	-
Lizard: Lacertilia	1	1	.11	-	-
Snake: Colubridae	18	1	2.01	-	-
Snake: Crotalidae	2	1	.22	-	-
Snake, spp.	81	-	9.07	-	-
Total Ident. Reptile Bone Pieces	453	10	50.69	4.60	1.07
Amphibians					
Hellbender, *Cryptobranchus alleganiensis*	17	2	1.90	-	-
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	9	2	1.00	-	-
Toad, *Bufo* spp.	37	4	4.14	-	-
Bullfrog, *Rana catesbeiana*	1	1	.11	-	-
Frog, *Rana* spp.	13	3	1.45	-	-
Toad/Frog spp.	27	-	2.91	-	-

Table 10 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total Ident. Amphibian Bone Pieces	104	12	11.51	-	-
Fish					
Gar, *Lepisosteus* sp.	1	1	.11	-	-
Common Stoneroller, *Campostoma anomalum*	1	1	.11	-	-
Creek Chub, *Semotilus atromaculatus*	1	1	.11	-	-
Chub, *Nocomis* spp.	2	2	.22	-	-
Shiner, *Notropis* sp. (Cyprinella)	1	1	.11	-	-
Minnow spp. Cyprinidae	5	3	.55	-	-
Buffalo, *Ictiobus* sp.	2	1	.22	-	-
Northern Hogsucker, *Hypentelium nigricans*	3	1	.33	-	-
River Redhorse, *Moxostoma carinatum*	1	1	.11	-	-
Redhorse, *Moxostoma* sp.	8	2	.89	-	-

Table 10 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Sucker spp., Catostomidae	25	2	2.79	-	-
Catfish, *Ictalurus* sp.	1	1	.11	-	-
Catfish, Ictaluridae	4	2	.44	-	-
Sunfish spp., Centrarchidae	25	4	2.79	-	-
Freshwater Drum, *Aplodinotus grunniens*	14	2	1.56	-	-
Total Ident. Fish Bone Pieces	94	25	10.45	-	-
Indet. Fish Bone Pieces	2,086				
Total Fish Bone	2,180				
Total All Ident. Bone	893	76	99.75	425.59	99.93
Total All Indet. Bone	8,646				
Total All Bone	9,539				

available at the site. The domestic dog was also represented at 40BD55, but solely by dental remains found in Feature 5. It is thus impossible to tell whether dogs were utilized as a food resource.

Not all the mammals found at 40BD55 are believed to be food items. A majority of the small rodents may have been natural occurrences at the site and were most likely pests that fed in part off food stores gathered by the Indians. These rodents include deer mouse, hispid cotton rat, southern bog lemming, pine vole, and meadow jumping mouse.

Of the 388 bird bones that were recovered from 40BD55 only 17 were specifically identifiable. Three of these could be identified only as being from indeterminate species of passerine birds. The remaining 14 elements were from bobwhite (3) and turkey (11). Both of these gallinaceous birds are year round residents that prefer open or "edge" habitats (Robbins et al. 1966). Both birds have a large meat yield for their size. Turkeys were the fourth largest meat source at 40BD55. Bird remains, however, are poorly represented at the site compared to those of other vertebrate groups.

Bird egg shell fragments are possibly some of the most interesting and potentially significant avian remains from the site. Rarely have egg shell fragments been reported from prehistoric archeological sites in the eastern United States. There were 82 egg shell fragments found in four features at 40BD55. The majority (52 pieces) were found in Feature 6, with 25 pieces noted in Feature 2, one piece in Feature 3 and four fragments in Feature 5. With egg

shell fragments so abundant and dispersed over the site, it may be assumed that they were probably a common dietary supplement, when available in the spring and early summer.

The 453 reptile bones found at 40BD55 made up 50.69% of the total site identifiable bone. The box turtle was the best represented species with 165 identifiable pieces. Kinosternid turtle remains (the stinkpot or mud turtles) and specimens identifiable as Graptemys/Chrysemys spp. were present in the faunal sample, but in fewer numbers than those of the box turtle. Also present were skeletal elements from poisonous (crotalid) and non-poisonous (colubrid) snakes and a single element from an indeterminate species of lizard.

All the above species, with the exception of the lizard, were probably utilized as meat resources. The lizard was a very small animal and was most likely of natural occurrence at the site. The box turtle and the snakes could have been collected from the wooded areas surrounding the site during the warm weather months. It is quite possible that the aquatic turtles were caught while net fishing.

A total of 104 amphibian remains was recovered from 40BD55; these made up 11.51% of all identifiable bone. The remains of toads (37 elements) were most common. Bufo americanus and Bufo woodhousei fowleri occur in the project area. Spadefoot toad remains were also found in the faunal sample. It is doubtful, however, that either the bufonid toads or the less common spadefoot toad served as food

resources. These species would have naturally frequented the site area. Ranid frogs, and most especially the bullfrog, are commonly found in or near permanent bodies of water. The frogs at 40BD55 could have been gathered from either the Duck River or Thompson Creek, as both are in close proximity to the site. Frogs, then as now, may have been considered good eating.

Seventeen hellbender skeletal elements were found at the site. The hellbender is a totally aquatic salamander that is generally found in fast running water of rivers and large creeks (Smith 1961). In all probability the hellbenders were taken in nets while fishing, but they could also have been caught on a baited hook or by hand.

Fish made up 10.45% of the site's identifiable bone (94 elements) and 22.85% of the total bone (2,180 elements). At least 11 species of fish were represented in the faunal remains. Surprisingly, four of these were relatively small minnows: Campostoma anomalum, Semotilus atromaculatus, Nocomis sp., and Notropis spp. Identification of these minnows was made from phryngeal arches. The minnows at the Shofner site may have been the remains of direct human exploitation, or they may have been in the stomachs of predatory fish such as the gar which were caught and prepared by the Indians.

Only a single, indeterminate gar skull fragment was found at Shofner. Since gar skeletal elements and scales generally preserve quite well, their near absence in the sample suggests that gars were only infrequently exploited. Gars characteristically inhabit warm, sluggish backwaters of larger rivers and lakes where they often bask

in the sun just beneath the water's surface. The upper Duck River is a rather small, fast flowing stream that may have offered little suitable habitat for a large population of gars.

A number of bottom feeding fish were identified from the Shofner faunal remains. Suckers were the most common of these with 39 skeletal elements from at least three species (the buffalofish, northern hogsucker, and river redhorse). Catfish (Ictalurus sp. and indeterminate ictalurids) were present also, but in lesser numbers (5 elements). The freshwater drum was represented by 14 skeletal elements. Although their feeding habits are similar, behaviorial differences exist which would have affected their means of capture. The catfish are more solitary fishes and generally do not congregate in large numbers in shallow waters. Suckers, on the other hand, can be found congregated in large numbers in small streams during their spring spawning runs. Freshwater drum are also said to gather in shallow waters to spawn (Pflieger 1975). During these runs suckers and freshwater drum could easily have been speared or even dipped from the water in hand nets. All the above species could have been caught on hook and line or in nets.

Sunfish remains are also common in the faunal sample (25 elements). Twelve species of sunfish are currently found in the Duck River (Appendix A), but the remains from 40BD55 were too fragmentary to permit exact identifications. Sunfish are usually rather solitary and would probably have been caught in nets or on hook and line.

There were 1,149 fish scale fragments found at 40BD55. A total

of 1,013 was recovered from Feature 2, 3 in Feature 4, 29 in Feature 5, 95 in Feature 6, and 9 in Feature 7. None of these scales could be specifically identified, but some of the more complete examples resemble cycloid scales of the type found on suckers.

There were at least 22 species of freshwater mussels and one species of sphaeriid clam represented in the sample from 40BD55 (Table 11). Based upon the past collections of Ortmann (1924) and Isom and Yokley (1968), 50 species of unionacean clams have been collected historically from the Duck River. Thirteen of these species have been found in the upper Duck River. TVA (1972) listed four species of sphaeriid clams as occurring in the Duck River.

One of the 22 species recorded for 40BD55, Epioblasma lewisi, is a new record for the Duck River. Only a single valve was recovered. Burch (1975) notes that E. lewisi has historically been found in the Holston and Clinch rivers of Tennessee and the Cumberland River in Kentucky. Archeological samples of the shell were found by Clench (1974) in the material from Russell Cave, by Warren (1975) in the Widows Creek site material, and by Morrison (1942) from seven sites in the Pickwick Basin. Warren (1975) and Morrison (1942) both list E. lewisi as a form of E. flexuosa. Epioblasma lewisi was in the minority at all of these sites. Morrison feels that its scarcity may be due to its suggested habitat on muddy bottoms in deeper water. Prehistorically it would appear that E. lewisi was distributed throughout the Tennessee River system.

The 2,545 mussel shells in the site sample were from three

Table 11

Pelecypoda from the Shofner Site (40BD55)

Species	Valves	MNI	Percent Of Total
Fusconaia barnesiana*	599	334	23.55
Lexingtonia dolabelloides*	314	176	12.34
Fusconaia/Lexingtonia sp.	125	69	4.91
Amblema plicata	4	4	.15
Quadrula cylindrica	8	6	.31
Cyclonaias tuberculata	1	1	.03
Pleurobema oviforme*	10	9	.39
Elliptio dilatata	56	29	2.20
Pegias fabula*	43	26	1.69
Strophitis undulatus	2	1	.07
Ptychobranchus subtentum*	469	251	18.44
Obovaria subrotunda	1	1	.03
Lemiox rimosus	51	29	2.00
Medionidus conradicus*	249	127	9.79
Villosa taeniata*	49	26	1.92
Villosa vanuxemensis*	22	13	.82
Villosa cf. iris	7	7	.27
Villosa sp.	247	147	9.71
Villosa sp./Epioblasma capsaeformis	223	131	8.76
Lampsilis ovata	8	4	.27

Table 11 (continued)

Species	Valves	MNI	Percent Of Total
Lampsilis fasciola	41	27	1.61
Epioblasma triquetra	3	3	.11
Epioblasma cf. florentina*	1	1	.03
Epioblasma capsaeformis*	7	4	.27
Epioblasma lewisi*	1	1	.03
Sphaeriidae	4	2	.15
Total Ident. Pelecypods	2,545	1,429	99.85

* Cumberlandian species.

features, with the vast majority of them (2,374 valves) being from Feature 2. The pelecypod shells were found evenly mixed with large quantities of freshwater snail shell and animal bone in the Feature 2 soil matrix. No definite stratigraphy was noted in the feature; the feature fill appears to have been deposited over a rather short time.

With the exception of Epioblasma lewisi, all of the mussel species and forms present in the sample are smaller, more compact forms that could have been expected in this portion of the Duck River or in the lower section of Thompson Creek. At least 12 and possibly more of the recovered species are Cumberlandian forms. These are noted on Table 11 with an asterisk. The four most common species at the site were Fusconaia barnesiana, Ptychobranchus subtentum, Lexingtonia dolabelloides and Medionidus conradicus, all considered to be Cumberlandian forms (Isom et al. 1973). Together these four species make up 64.08% of the total collection of pelecypods found at the site. Fusconaia barnesiana, P. subtentum and M. conradicus are species which prefer sand/gravel substrates, generally in smaller rivers and creeks. They are usually found in rather shallow water with a strong current.

Although L. dolabelloides has both large and small river forms, the form recovered from 40BD55 is the smaller more compressed variety most common to smaller streams. Warren (1975) notes that L. dolabelloides is most generally found in those portions of the river having a strong current, an average water depth of 1-3 feet and a sand or gravel substrate in which to anchor itself.

Based upon the size, shape, and the species composition of the mussels recovered from 40BD55, the pelecypods found at the site were almost certainly recovered from either the Duck River or the lower portion of Thompson Creek, both of which are immediately adjacent to 40BD55. The mussels were, in all likelihood, gathered at the same time and from the same locales as the freshwater snails. Each of these groups is most common to stream riffle areas.

There were at least seven species of freshwater gastropods belonging to five genera in the samples from 40BD55. Six of these species are members of the family Pleuroceridae and one belongs to the Viviparidae. At least 11 species from six genera have been collected historically from the Duck River and its tributaries (Appendix A). Six features contained freshwater gastropods, but only Features 3, 4, 5, 6, and 7 had their contents completely analyzed. There was a total of 21,632 identifiable shells in these five features. Because of the enormity of the freshwater gastropod assemblage contained in Feature 2, it was decided that it should be stratified and only a representative sample examined in order to make the task of shell identification more manageable. One eighth of Feature 2 produced 24,799 identifiable shells, more than the entire shell contents of the other five features combined.

A riffle sorter was used to divide the shell from each quadrant of Feature 2 into eight equal parts (each part is 1/32nd of the entire feature). One 1/32nd sample was randomly chosen from each of the quadrants for analysis. A numerical and percentage breakdown of

the species found in each quadrant appears in Table 12. As can be seen in this table, the species composition and counts for each quadrant lack significant differences. Thus, it should be valid to estimate the total number of freshwater snails in Feature 2 by multiplying the actual specimens analyzed for each species by eight. Based upon these calculations, there should have been approximately 198,392 freshwater snails in Feature 2 (Table 13).

Table 14 lists the actual number of shells analyzed from all six features at 40BD55, and Table 15 illustrates the estimated total figures for all six features if all specimens from Feature 2 had been identified and counted. Note that, with the exception of Lithasia sp., there are no significant differences in total percentages between those specimens actually identified and the estimated numbers. The percentage differences for Lithasia sp. (1.03% for those actually identified vs .46% for the estimated total) are probably due to the better preservation of the shell specimens in Feature 2. More Lithasia in Feature 2 were identifiable to the species level. In the following species discussions and the site summary, the estimated species numbers and percentages from Table 15 will be utilized.

Pleurocera canaliculatum, with an estimated 117,828 specimens, was by far the most numerous species of freshwater gastropod found at 40BD55. Slightly over one-half (53.55%) of all the freshwater snails recovered were of this species. Based upon shell morphology all specimens of P. canaliculatum from 40BD55 are thought to be the filum

Table 12

Feature 2 Freshwater Gastropoda by Quadrant, Specimens Actually Analyzed, 40BD55

Species	Pieces				
	NE¼	NW¼	SE¼	SW¼	Total
Lithasia armigera form duttoniana	269	257	260	279	1,065
Lithasia geniculata form fuliginosa/ L. salebrosa	332	315	331	301	1,269
Lithasia obovata form sordida	195	189	181	179	744
Lithasia sp.	17	20	22	19	78
Pleurocera canaliculatum form filum	3,301	3,327	3,354	3,296	13,278
Goniobasis laqueta/edgariana	1,687	1,660	1,608	1,616	6,571
Leptoxis subglobosa	463	420	456	424	1,763
Viviparous georgianus	11	5	8	7	31
Total Gastropods	6,265	6,193	6,220	6,121	24,799

Table 13

Feature 2 Freshwater Gastropoda, Estimated Number of Specimens, 40BD55

Species	No. of Shells Identified in 4 1/32 Samples		Total Estimated Shell
Lithasia armigera form *duttoniana*	1,065	x 8 =	8,520
Lithasia geniculata form *fuliginosa/L. salebrosa*	1,269	x 8 =	10,152
Lithasia obovata form *sordida*	744	x 8 =	5,952
Lithasia sp.	78	x 8 =	624
Pleurocera canaliculatum form *filum*	13,278	x 8 =	106,224
Goniobasis laqueta/edgariana	6,571	x 8 =	52,568
Leptoxis subglobosa	1,763	x 8 =	14,104
Viviparous georgianus	31	x 8 =	248
Total Estimated Freshwater Gastropods			198,392

Table 14

Freshwater Gastropoda from the Shofner Site (40BD55),
Specimens Actually Analyzed from All Features

Species	Feature 2	Other Features	Total	Percent Of Total
Lithasia armigera form duttoniana	1,065	1,180	2,245	4.83
Lithasia geniculata form fuliginosa/ L. salebrosa	1,269	946	2,215	4.77
Lithasia obovata form sordida	744	270	1,014	2.18
Lithasia sp.	78	403	481	1.03
Pleurocera canaliculatum form filum	13,278	11,604	24,882	53.58
Goniobasis laqueta/edgariana	6,571	5,818	12,389	26.68
Leptoxis subglobosa	1,763	1,374	3,137	6.75
Viviparous georgianus	31	37	68	.14
Total Ident. Freshwater Gastropods	24,799	21,632	46,431	99.96

Table 15

Freshwater Gastropoda from the Shofner Site (40BD55), Estimated Specimens from All Features*

Species	Estimated Pieces	Percent Of Total
Lithasia armigera form duttoniana	9,700	4.40
Lithasia geniculata form fuliginosa/L. salebrosa	11,098	5.04
Lithasia obovata form sordida	6,222	2.82
Lithasia sp.	1,027	.46
Pleurocera canaliculatum form filum	117,828	53.55
Goniobasis laqueta/edgariana	58,386	26.53
Leptoxis subglobosa	15,478	7.03
Viviparous georgianus	285	.12
Total Estimated Freshwater Gastropods	220,024	99.95

* Estimated numbers from Feature 2 have been added to actual numbers from Features 3, 4, 5, 6, and 7 for these totals.

form (the body whorls of this form are characteristically concave from suture to periphery). Pleurocera canaliculatum form undulatum has also been collected from the Duck River, but only from near its mouth (Goodrich 1937).

Goodrich (1938) notes that many forms of P. canaliculatum inhabit muddy situations. Morris (1939) concurs with this and states that P. canaliculatum are often found on the open shore in moderately shallow water, sometimes buried in the mud with only their spires protruding. While the above is most certainly true, the author has also collected P. canaliculatum from the Duck River in shallow, clear water in riffle areas.

The second most numerous species of freshwater gastropod recovered from 40BD55 was Goniobasis laqueta/edgariana (58,386 estimated specimens). Both G. laqueta and G. edgariana have been collected from the Duck River. The two species have been grouped together since they are very similar in appearance and it was not possible to differentiate the archeological specimens based upon the comparative shells available to the author.

Goniobasis edgariana has been collected from a number of shallow water habitats. It has been found on limestone rocks, on coarse and fine gravel, and in mud and sand substrates. Goodrich (1923) encountered G. edgariana in riffle areas, slowly flowing water, eddies, and quiet pools. Although no specific ecological information could be found on G. laqueta, it is presumed to be nearly as ubiquitous as G. edgariana in the habitats it can occupy.

Leptoxis subglobosa was the third most numerous aquatic snail species at 40BD55 (15,478 estimated specimens). There are two species of Leptoxis in the Duck River, subglobosa and praerosa. Leptoxis subglobosa, which is found in headwaters or tributary streams, is usually smaller and has a more elevated spire than its close relative L. praerosa, generally a large river species. Based upon their head waters position and morphology all Leptoxis specimens from 40BD55 are thought to be L. subglobosa.

There were an estimated 11,098 specimens of Lithasia geniculata form fuliginosa/L. salebrosa recovered from 40BD55. The two taxa are similar enough morphologically that it was not thought practical to separate archeological specimens. Lithasia geniculata form fuliginosa is the midstream form of the L. geniculata "complex". This "complex" also includes L. g. form geniculata and L. g. form pinguis. These three forms represent clinal variants--geniculata is the downstream form and pinguis is the headwaters form.

No precise data could be located on the ecological requirements of either L. geniculata form fuliginosa or L. salebrosa. Tryon (1873) noted that Conrad found L. salebrosa in large numbers adhering to logs in the Tennessee River. The author has collected numerous L. geniculata form pinguis from riffle areas in the upper Duck River where they were found clinging to river gravels and limestone slabs. It may be presumed that L. geniculata form fuliginosa can be found in similar situations.

Lithasia armigera form duttoniana was the fifth most numerous

freshwater snail found at 40BD55 (9,700 estimated specimens). Lithasia armigera is considered by Davis (1974) to be part of a "complex" which includes L. a. form armigera, L. a. form jayana and L. a. form duttoniana. These three Lithasia are thought by Davis (1974) to be clinal variants--duttoniana the upstream form, armigera the downstream form and jayana the form from the mouth of the stream. Based upon their morphology, the L. armigera specimens from 40BD55 are all believed to be the duttoniana form.

No precise data on the ecological requirements of the L. armigera complex could be located in the literature. The author has, however, collected L. armigera form duttoniana from riffle areas in the Duck River where it was found clinging to pebbles in the gravel substrate.

An estimated 6,222 specimens of Lithasia obovata form sordida were present in the features excavated at 40BD55. No records could be found of this species having been historically collected from the Duck River or its tributaries. Although a number of forms of L. obovata are often said to exist together, all those collected from 40BD55 most closely resemble the sordida form. No precise data on the ecology of L. o. form sordida could be found, but its requirements are presumed to be similar to those of other Lithasia species. Most likely they can be found in shallow water riffle areas adhering to large stone outcrops or gravels on the river bottom.

Lithasia sp. as a category consists of badly broken or undiagnostic immature Lithasia specimens. There were an estimated

1,027 shells in this category from 40BD55. The genus Lithasia made up 12.72% of the total estimated shells collected from 40BD55.

The estimated 285 Viviparous georgianus recovered from 40BD55 made up .12% of the total freshwater snail sample. Viviparous georgianus was the only species of viviparid snail present in the sample. It was probably present in such small numbers because its preferred habitat made its collection difficult. This species is generally found in backwater areas where it most often burrows into substrates of mud, sand, or vegetation (Clench and Turner 1956).

Pleurocerid species made up an overwhelming majority of the estimated number of freshwater snails from 40BD55 (99.83% of the total). Based upon their general environmental requirements, it can be assumed that the pleurocerid snails were collected from a riffle area in a nearby stream. The Shofner site lies adjacent to the juncture of Thompson Creek with the Duck River. Conditions are such that either stream near this location could have supported the freshwater snail assemblage recovered from 40BD55.

Of the seven features excavated at 40BD55, Features 2 and 5 had the largest samples of terrestrial snails. Preservation was not as good in the other features. A subsampling strategy was felt to be in order due to the large numbers of these snails recovered from these two features. Feature 2 was originally excavated in equal quadrants. After a visual examination of the terrestrial snail sample from each quadrant, it was felt that each was of nearly the same size and species composition. The northeast quadrant was then randomly chosen

for analysis and all snails from this quadrant larger than 4 mm were identified. A geological screen was used to sort the snails by size and a riffle sorter was used to divide that portion of the sample smaller than 4 mm into two equal parts (each was 1/8 of the entire feature). One of these samples was randomly chosen for analysis. For Feature 5 all specimens larger than 4 mm and 1/8 of the sample smaller than 4 mm were identified.

Table 16 displays the actual numbers of snails identified, while Table 17 records the estimated numbers if both features had been entirely examined. In calculating the Feature 2 estimated numbers, all species larger than 4 mm had the number actually analyzed multiplied by 4, while those smaller than 4 mm had their numbers multiplied by 8. For Feature 5 all snails over 4 mm were completely identified; all species smaller than this had the numbers identified multiplied by 8 to calculate their estimated abundance in the feature. Those species smaller than 4 mm are denoted on the tables by an asterisk after the species name.

Analysis of the terrestrial snails from Features 2 and 5 at 40BD55 indicated that there were at least 26 different species present in the features. Sixteen of these species each made up less than 1% of the estimated total. Ten species and 3 groups of immatures, listed here in their order of abundance, made up 97.88% of the estimated total: Hawaiia minuscula, Gastrocopta armifera, Zonitoides arboreus, Polygyra troostiana, Gastrocopta contracta, Gastrocopta sp., Retinella sp., Punctum vitreum, Mesodon inflectus,

Table 16

40BD55 Terrestrial Gastropods, Specimens Actually Analyzed

Species	Feature 2 Specimens Analyzed	Feature 5 Specimens Analyzed	Total Both Units
Helicina orbiculata	1	-	1
Pupoides albilabris*	2	1	3
Gastrocopta armifera*	279	4	283
Gastrocopta contracta*	133	13	146
Gastrocopta rupicola*	2	-	2
Gastrocopta procera*	1	-	1
Gastrocopta pentadon*	1	-	1
Gastrocopta sp. (immatures)*	65	43	108
Strobilops labyrinthica*	8	-	8
Strobilops sp.*	-	1	1
Catinella sp.	2	-	2
Anguispira alternata	1	-	1
Helicodiscus sp.*	-	1	1
Punctum vitreum*	78	7	85
Mesomphix cf. capnodes	4	-	4
Mesomphix cupreus	3	-	3
Retinella lewisiana*	21	-	21
Retinella cf. indenta group	59	-	59
Retinella sp. (immatures)*	100	-	100
Euconulus dentatus*	31	4	35
Hawaiia minuscula*	519	181	700
Ventridens acerra or demissus	12	-	12
Zonitoides arboreus*	197	60	257
Stenotrema leai aliciae	2	3	5
Stenotrema stenotrema	12	-	12
Polygyra troostiana	326	129	455
Mesodon inflectus	102	10	112
Mesodon downianus or clausus	7	2	9
Triodopsis obstricta	6	-	6
Polygyridae (immatures)	92	-	92
Totals	2,066	459	2,525

* Species smaller than 4 mm, 1/8 of Features 2 and 5 were analyzed for these species. All other species are larger than 4 mm; 1/4 of Feature 2 and all of Feature 5 were analyzed for these species.

Table 17

40BD55 Terrestrial Gastropods, Estimated Specimens

Species	Feature 2 Estimated Specimens	Feature 5 Estimated Specimens	Total Both Units	Percentage Both Units Combined
Helicina orbiculata	4	-	4	.02
Pupoides albilabris*	16	8	24	.14
Gastrocopta armifera*	2,232	32	2,264	13.57
Gastrocopta contracta*	1,064	104	1,168	7.00
Gastrocopta rupicola*	16	-	16	.09
Gastrocopta procera*	8	-	8	.04
Gastrocopta pentodon*	8	-	8	.04
Gastrocopta sp. (immatures)*	520	344	864	5.18
Strobilops labyrinthica*	64	-	64	.38
Strobilops sp.*	-	8	8	.04
Catinella sp.	8	-	8	.04
Anguispira alternata	4	-	4	.02
Helicodiscus sp.*	-	8	8	.04
Punctum vitreum*	624	56	680	4.07
Mesomphix cf. capnodes	16	-	16	.09
Mesomphix cupreus	12	-	12	.07
Retinella lewisiana*	168	-	168	1.00
Retinella cf. indenta group	236	-	236	1.41
Retinella sp. (immatures)*	800	-	800	4.79
Euconulus dentatus*	248	32	280	1.67
Hawaiia minuscula*	4,152	1,448	5,600	33.58
Ventridens acerra or demissus	48	-	48	.28
Zonitoides arboreus*	1,576	480	2,056	12.32
Stenotrema aliciae	8	3	11	.06

Table 17 (continued)

Species	Feature 2 Estimated Specimens	Feature 5 Estimated Specimens	Total Both Units	Percentage Both Units Combined
Stenotrema stenotrema	48	-	48	.28
Polygyra troostiana	1,304	129	1,433	8.59
Mesodon inflectus	408	10	418	2.50
Mesodon downianus or clausus	28	2	30	.17
Triodopsis obstricta	24	-	24	.14
Polygyridae (immatures)	368	-	368	2.20
Totals	14,012	2,664	16,676	99.82

* Species smaller than 4 mm, 1/8 of Features 2 and 5 were analyzed for these species. All other species are larger than 4 mm; 1/4 of Feature 2 and all of Feature 5 were analyzed for these species.

Polygyridae spp., Euconulus dentatus, Retinella cf. indentata group, and Retinella lewisiana. Hawaiia minuscula by itself accounted for 33.58% of the estimated total.

The most numerous species in the 40BD55 sample are those with the greatest habitat breadth, so no detailed environmental conditions can be inferred from their presence. It is possible, however, to make some general inferences about the camp area based upon the species present. Almost all the species found at 40BD55 are common in deciduous forests, often buried in the moist leaf litter found on the forest floor. A majority also prefer to live in areas with limestone based soils or limestone outcrops (Archer 1939; Baker 1930; Bickel 1968; Burch 1956, 1962; Coney 1980; Grimm 1959; Hubricht 1952, 1962; Lutz 1950; Morrison 1942; Pilsbry 1940, 1946, 1948; and Richards 1934).

The terrestrial snails found in Features 2 and 5 were probably drawn from their preferred wooded habitat to the more open and disturbed area of site 40BD55 for two reasons. Most terrestrial gastropods are herbivorous and are said to eat the mycelia of fungus forms as a major portion of their diet (Leonard 1959). Rotting vegetation and animal matter in the features should have provided a bonanza for growing fungi. Also, the numerous aquatic gastropod and pelecypod shells thrown in the feature fill would have provided readily available calcium carbonate needed for shell development of the terrestrial species. It is doubtful that any of the terrestrial gastropod species present in the features were utilized as food

resources since the vast majority are minute; in all probability they are natural inclusions in the features.

At 40BD55 mammals appear to have been the most important group of animals in the diet. Mammals are not only represented by the greatest number of bone fragments and species, but they also make up the largest amount of meat potentially available for consumption. The white-tailed deer, which is represented by three individuals, was obviously the single most valuable animal in the diet. All other bird, reptile, amphibian, fish, pelecypod, and gastropod species would appear to have been only supplemental food resources.

In examining the animals utilized by the Indians at 40BD55 one is struck by the large number of habitats that were exploited to gather these species. The fish, frogs, aquatic turtles, and beaver could all have been collected from nearby streams or swamps. Mussels and freshwater snails may have been gathered from the Duck River or Thompson Creek. Certain of the animals, such as the woodchuck, would have been more readily found in open areas. Others such as the striped skunk, gray fox, cottontail, white-tailed deer, turkey, bobwhite, and box turtle prefer forest edge or open forest habitats. The raccoon and gray squirrel are most often found in heavily wooded areas near streams. The fox squirrel is also found in wooded areas, but generally on higher ridges away from the bottomlands. The various species of colubrid and crotalid snakes available in the project area occupy a wide variety of habitats. As will be shown in later discussions, in order to efficiently capture and utilize such a

diverse number of species from an almost equally diverse number of habitats, the Owl Hollow peoples had to employ exploitation strategies which took into account the geographic, numerical, and seasonal availability of the animals.

Of those faunal species definitely utilized by the Indians at the Shofner site, the woodchuck, box turtle, snakes, and frogs may be considered good seasonal indicators of site occupation. All are available only during the warm weather months, the winters being spent in hibernation. Woodchucks generally begin their hibernation by the end of October and emerge in February or March (Schwartz and Schwartz 1959). The reptile and amphibian species initiate their hibernation when the weather begins to cool in the autumn and emerge in the spring when it is sufficiently warm too maintain their preferred body temperatures. Bird egg shell fragments would also be good seasonal indicators since most birds lay their eggs only during the spring and early summer months.

A white-tailed deer frontal fragment with an antler pedicel, from which the antler had been shed, was recovered from Feature 2. White-tailed deer generally shed their antlers in the winter months (late December through February). Since new antler growth starts in April or May (Schwartz and Schwartz 1959), this implies that the buck had been taken in the winter.

Plant remains recovered from the site include, in part, seeds from chenopodium, amaranth, knotweed, maygrass, and grapes in addition to hickory, walnut, and acorn nut shells. Mesoamerican

domesticates are represented by the remains of maize and squash (Crites 1978a). The nut crops, chenopodium, amaranth, knotweed, maize, and squash are all ready for consumption in the late summer and autumn and can be stored for utilization during the winter months. Maygrass ripens in the late spring and early summer, while grapes become edible during the summer.

No evidence of house structures was found at 40BD55 that suggests site seasonality. The faunal and floral seasonal indicators, however, suggest that the site was occupied the year round.

Four bones recovered from the site have butchering or skinning cut marks; all are from the white-tailed deer. The first is a rib fragment from Feature 2 which has a deep cut made diagonally across the long axis of the bone. It appears that the rib was pulled back and broken at this cut. This exercise may have been completed in order to cut the rib cage into portions that would fit into a cooking pot.

A right proximal radius of a deer had small butchering cuts on the anterior face of the bone just below the articular head. These cuts would have been made while separating the radius and ulna from the humerus; this is a very tight joint and it would have been difficult to sever it without leaving some evidence of the process.

Two of the three deer astragali found in Feature 6 possessed butchering cuts and in each case these appeared on the middle of the anterior face. These cuts would have been inflicted when the lower

hind leg (the metatarsal) was separated from the tibia. The metatarsal has no meat content and would have been useful mainly as a source of bone for making tools.

Although they display no evidence of butchering cuts, two articulating freshwater drum pharyngeal arches from Feature 6 illustrate how skeletal elements from the same animal may undergo different treatment before being deposited in a feature or midden. One of the arches has been heavily burned and is broken along the bone's outer edge, while its paired counterpart exhibits no evidence of burning or breakage. The two pieces were obviously separated for some time before they were deposited in the feature. One, for some reason, was thrown into a fire while the other escaped this fate. Loose animal bone was obviously often allowed to litter the site surface and to be affected differentially before being swept into an open feature.

Fourteen worked skeletal elements were recovered from four features at 40BD55. Six of these were from Feature 2, three from Feature 5, one from Feature 7, and four from Feature 6. All, except one made of bird bone, were derived from mammal skeletal elements.

Two bone splinter awls were recovered from Feature 2. Both were made from long bone splinters, one from a bird (Figure 6a) and the other from a mammal (Figure 6b). Neither splinter was complete enough to determine the specific long bone from which it was derived. Both awls were manufactured from rough bone splinters altered only by grinding one end of each piece to a very narrow point. Considerable

Figure 6. 40BD55. A. Bird bone splinter awl. B. Mammal bone splinter awl. C-D. Bone needles.

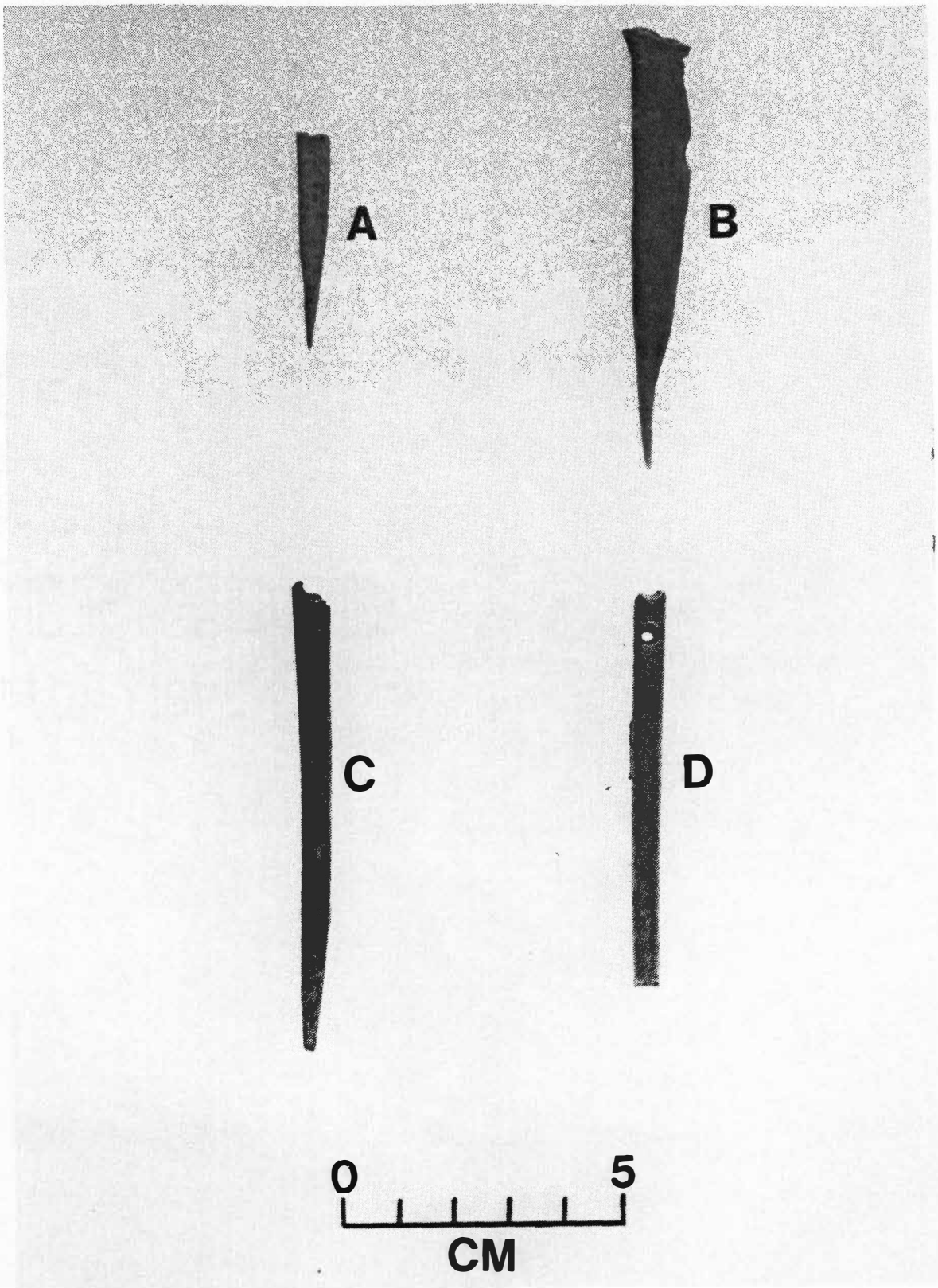

Figure 6.

polish, most probably from use, is evident along the distal end of each tool. The mammal bone awl appears to be complete, but the bird bone awl consists only of the original tool's distal pointed end.

Two worked beaver incisors were identified, one each from Features 2 and 6. The altered tooth from Feature 2 consists of the lower, anterior portion of a mandibular incisor which has been split lengthwise. Evidence of light grinding can be found along the sides of the piece nearest the anterior face. At its greatest extremes, the incisor fragment is 42 mm long, 6 mm wide, and (measuring from front to back) 3 mm thick.

A small midsection from either a beaver maxillary or mandibular incisor was found in Feature 6. Only one end of this fragment displays alteration; the tooth was cut transversely into two sections, after which the cut end was ground smooth and polished. The fragment is 14 mm long, 7 mm wide, and 6 mm thick. While no definite function can be determined for these incisor fragments, ethnographic accounts note that beaver incisors were often used as chisels (Swanton 1946).

Two needles and a possible needle shaft fragment were recovered from features at 40BD55. All three were made from large mammal long bone splinters and were highly polished. Each splinter shaft was ground smooth and had a roughly circular cross-section. Polishing removed most of the marks left from grinding, but those that remain run, for the most part, lengthwise down the needle shaft.

Only the top half of the eye and a small portion of the point

are missing from the needle recovered from Feature 2 (Figure 6c). The shaft of the needle is slightly curved and is more flattened in cross-section than either the needle from Feature 5 or the shaft fragment from Feature 7. Close examination shows that the needle's eye was probably circular and was made by drilling the shaft from two opposing sides.

The needle shaft recovered from Feature 5 is straight and circular in cross-section; the distal end of the piece is broken away (Figure 6d). Two eyes have been drilled into the shaft of this needle; only the lower most of the two is complete. It appears that the needle shaft broke at the first eye, necessitating the drilling of a second eye. The edges of the broken eye have been worn smooth and are polished, suggesting that the needle was used for some time after the first eye was broken. Both the broken eye and the complete eye were made by drilling from opposing sides.

Although the artifact from Feature 7 had both proximal and distal ends broken away, its general configuration suggests that it may have been part of a bone needle. As with the needles from Features 2 and 5, this fragment has been carefully ground into a slender rod with a circular cross-section and, although rather poorly preserved, it still displays considerable polish along its entire length.

Two altered sections of antler were recovered, one each from Features 2 and 6. Based upon its size, the antler tool from Feature 6 was probably made from a white-tailed deer lower antler beam

(Figure 7a). The burr around the base of the antler beam has been ground off, making it impossible to determine whether the antler was shed naturally or cut from the antler pedicel. Numerous heavy cut marks are present at the distal end of the artifact; these were probably inflicted with a stone cleaver when the distal end of the antler was removed. Evidence of battering around the proximal end of this antler beam tool suggests that it may have been used as a baton for working lithic materials.

The antler piece from Feature 2 is an antler tine that has undergone minor modification (this tine could be from either an elk or white-tailed deer) (Figure 7b). The tine fragment is 75 mm long and 24 mm wide at its greatest width. Alteration to the piece consists of a hole which has been cut into the tine. This hole is approximately 13 mm square and 8 mm deep, with somewhat smoothed edges. The function of this piece is unknown.

An awl manufactured from the left metacarpal of a white-tailed deer was recovered from Feature 6 (Figure 7c). To fashion the awl, the bone had been split in half lengthwise and the distal end of the dorsal half was ground to a point. The very distal tip of the awl is broken away. Considerable polish is present on the distal end and the lower posterior portion of the bone tool. This type of awl is unique for the Owl Hollow sites examined for this study, most awls are of the bone splinter variety.

Several miscellaneous pieces of worked bone were recovered from 40BD55. One of these was a small L-shaped fragment of mammal bone

Figure 7. 40BD55. A. Antler baton. B. Modified antler tine. C. Awl manufactured from a white-tailed deer left metacarpal.

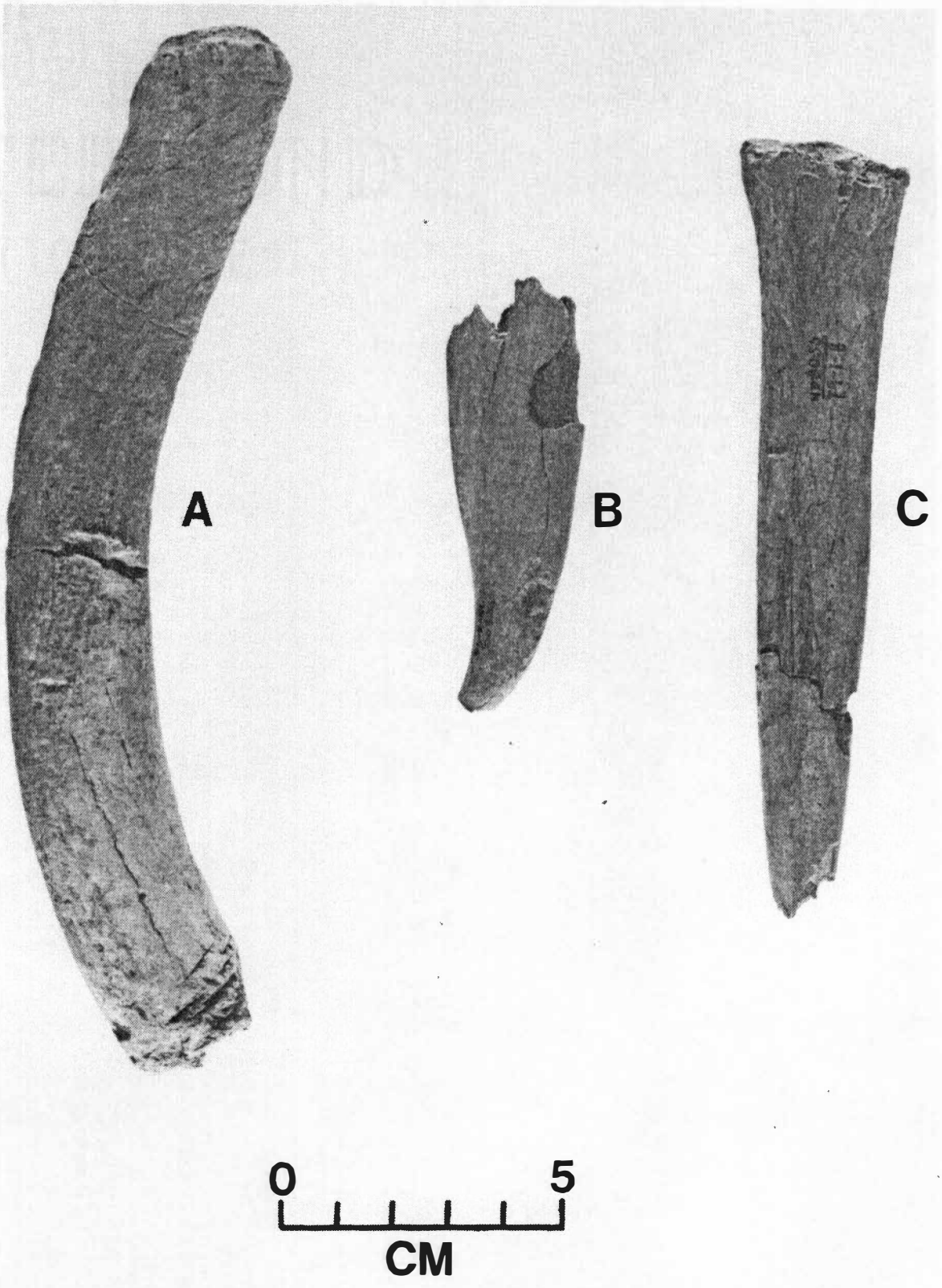

Figure 7.

found in Feature 2. Evidence of extensive grinding is present on its outer face and several cut marks can be found circling the top of the longer arm of the L. Another cut mark runs down the center of the shorter arm of the L on the outer face of the bone. The long arm of this artifact measures 15 mm in length, while the shorter measures 7 mm. Based upon the configuration of the piece, it is possible that it may have been intended for use as a fish hook. Why manufacture of the artifact was halted at this point is unknown.

Two miscellaneous pieces of worked mammal bone were recovered from Feature 5. One of these appears to be a small fragment from the shaft of a bone needle or pin; it is 11 mm long and 5 mm wide. The outer surface has been rounded and smoothed by grinding and polishing; mild searing or burning has blackened the artifact. The second artifact consists of a small, relatively flat bone fragment 14 mm long, 11 mm wide, and 3 mm thick. Only one end of this artifact was altered, having been cut square and then smoothed and slightly rounded by grinding and polishing. Originally, this piece was probably part of a larger tool.

A small flat piece of mammal bone, 23x11 mm, that was scored deeply on both sides of one end was recovered from Feature 6. This fragment appears to have been separated from its parent piece by breaking it away at the point where it had been scored. No other alteration or wear can be discerned on this fragment.

The Owl Hollow Site (40FR7)

The Owl Hollow site (40FR7), the type site for the Owl Hollow phase, was extensively tested during the summer of 1976 by the students of a University of Tennessee archeological field school. This site is located in west-central Franklin County, Tennessee, (35° 11' 33" north latitude and 86° 11' 45" west longitude) along the margin of the Eastern Highland Rim, approximately 140 ft above Town Creek, the nearest stream. Town Creek is a second order tributary of the Elk River, which lies approximately 1.4 miles north of the site.

The site was positioned quite favorably for its inhabitants to take advantage of a number of local microenvironments. To the west is the flat Highland Rim, which is thought to have been open and only intermittently forested. Mingo Swamp is also located on the Highland Rim, approximately 1.5 miles south and west of the site. The nearby valley slopes and bluffs of the dissected escarpment of the Highland Rim are immediately north, east and south of the site. Approximately 1.4 miles to the north is the Elk River with its broad floodplain. Less than 10 miles away, to the south and east, is the imposing western escarpment of the Cumberland Plateau.

The limits of the Owl Hollow site are quite well defined by the presence of a very dark brown, donut-shaped midden. Surface artifactual materials are quite numerous within the midden, but scarce outside of it. In all probability this ring shaped midden was formed by dumping refuse around the periphery of the village, most of

it apparently ash and burned limestone from earth ovens. The center of the village appears to have been kept relatively clear of refuse. The site measured nearly 600x600 feet and encompassed approximately eight acres. Dewy silt loam, an upland soil type, is the principal soil for the site locality (Fox et al. 1958). This cherty, grayish brown, medium to strongly acidic soil associates with the occurrence of an oak-hickory forest cover and is characterized as having moderate productivity.

Initially, excavation at 40FR7 consisted of bisecting the midden ring in an east-west direction with alternating 2x2 m test units. Expanded excavations were then conducted in four areas that had feature concentrations or intact subsurface middens (Figure 8). These excavation areas were referred to as the Western, Central, Eastern, and North Midden Expansion areas (Figures 9-11). The plowzone was removed from 812 square meters of the site (203 2x2 m units), bringing to light 654 subsurface disturbances classified either as postholes or features. All feature fill and the soil from 10 North Midden units and numerous postholes were waterscreened through two stacked screen boxes. The uppermost box was fitted with 1/4 in hardware cloth, while the lower utilized a fine window screen mesh. Standardized 2.5 gallon soil samples were taken from selected features, postholes, and midden levels with intact deposits. These soil samples were processed with the Owl Hollow flotation device.

Of the 654 subsurface disturbances discovered at the Owl Hollow site, 149 were classified as features. Cobb and Faulkner (1978)

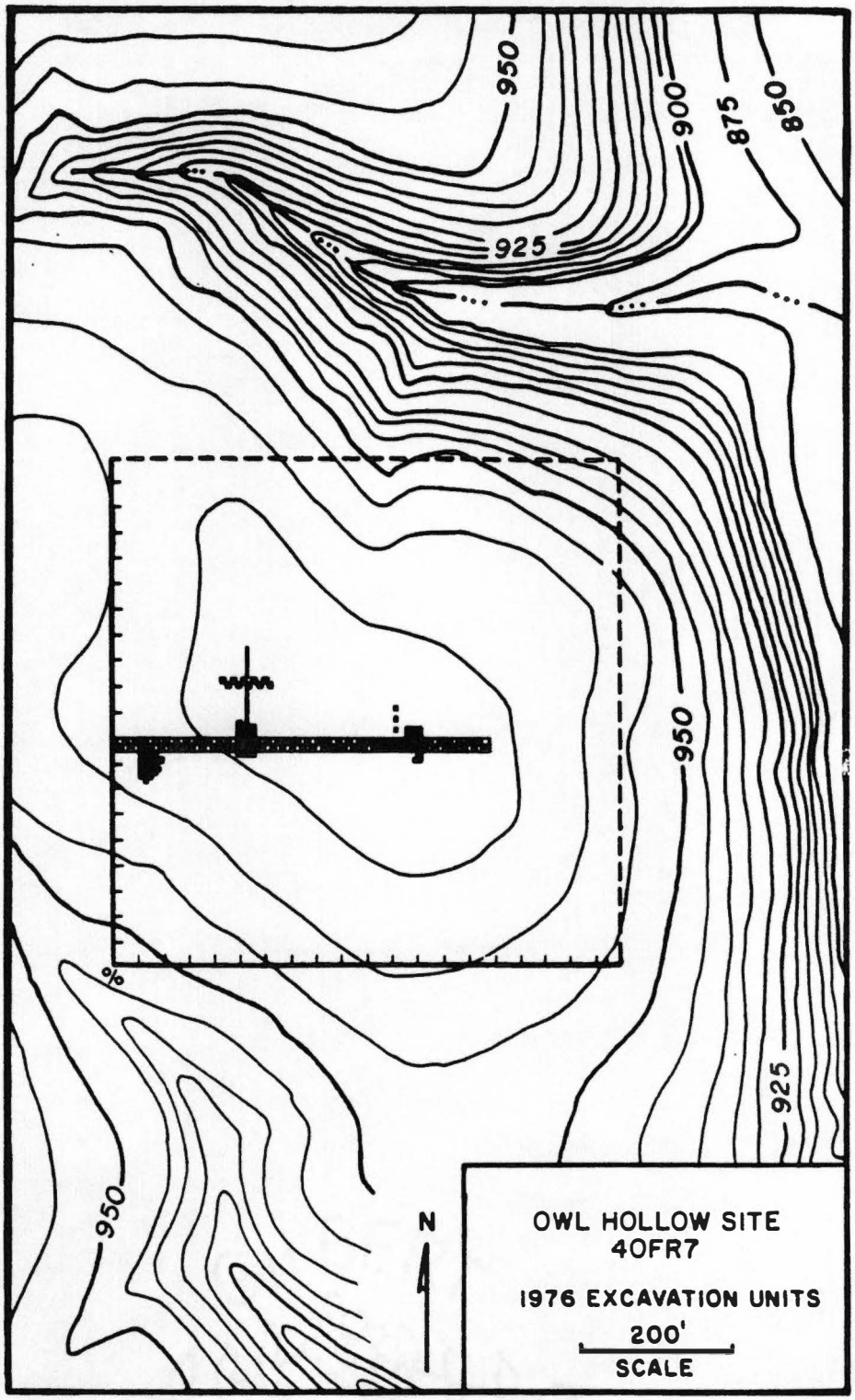

Figure 8. 40FR7. Phase II 1976 excavation units.

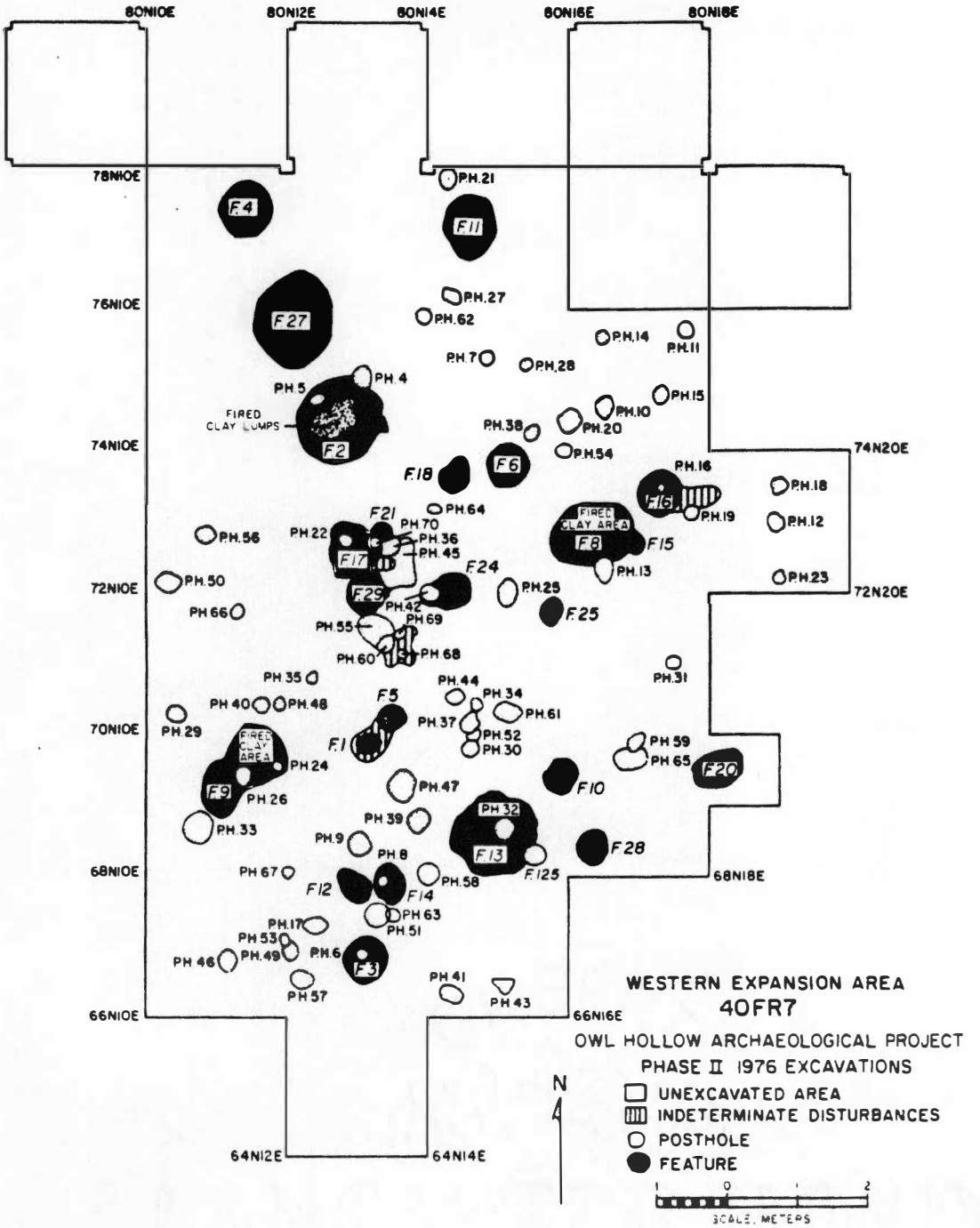

Figure 9. 40FR7. Phase II 1976 excavations, Western Expansion Area.

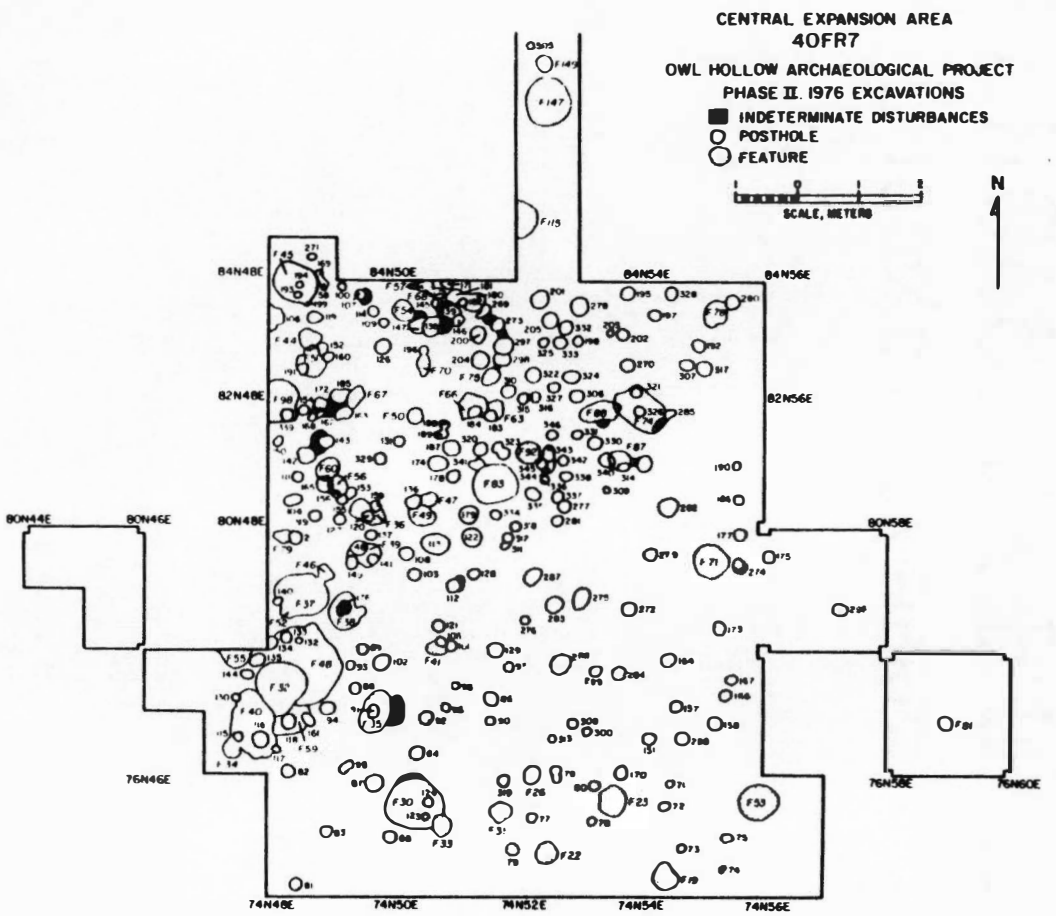

Figure 10. 40FR7. Phase II 1976 excavations, Central Expansion Area.

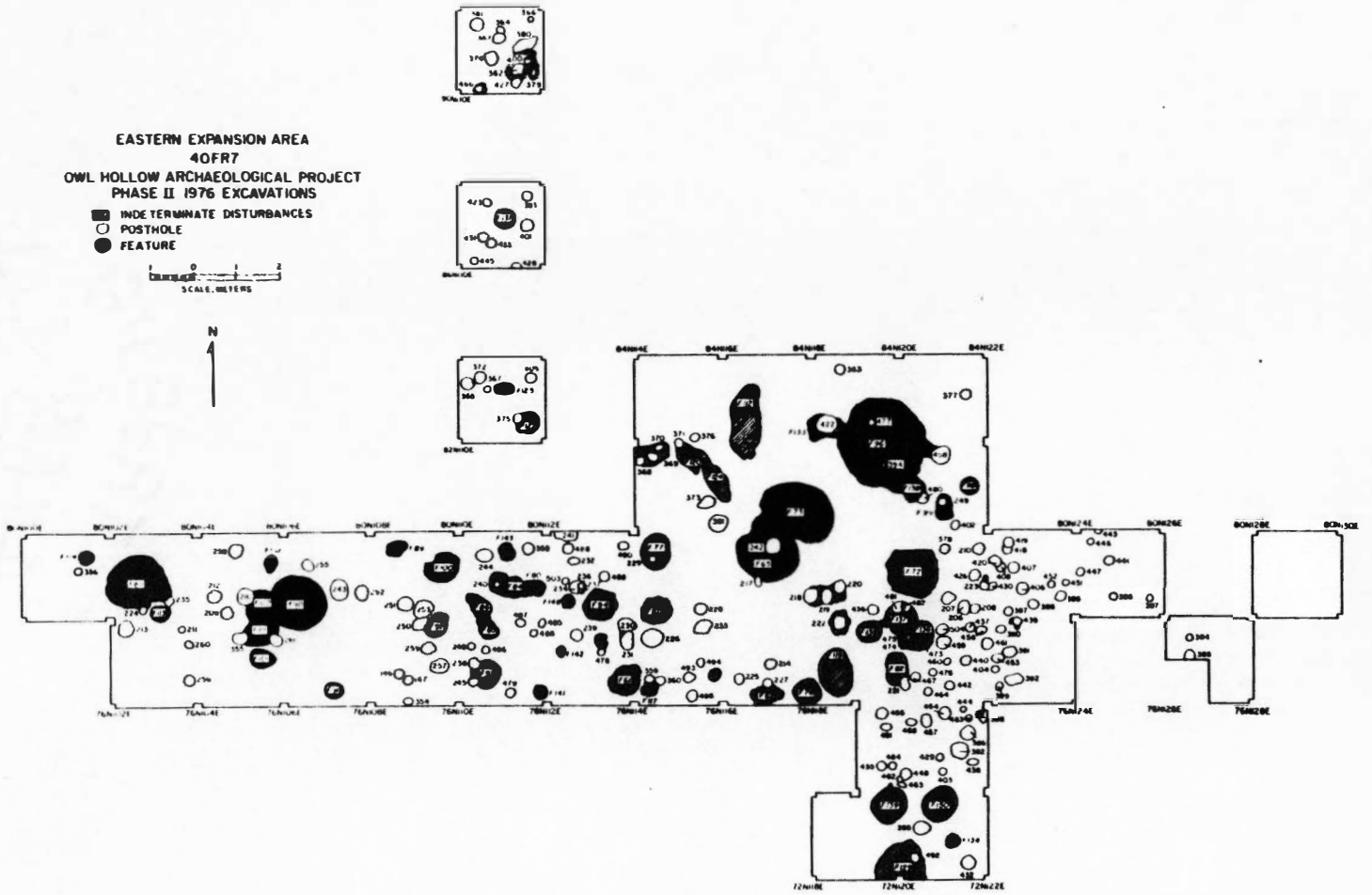

Figure 11. 40FR7. Phase II 1976 excavations, Eastern Expansion Area.

distinguished nine separate types of features. The first two types are not directly attributable to the aboriginal occupation; these include: Type 1) indeterminate disturbances (N=5), and Type 2) tree root disturbances (N=14). The remaining seven types include: Type 3) small to large, shallow, circular, oval or irregular shaped pits (N=71); Type 4) setting basins/structural support postholes (N=4); Type 5) storage/refuse pits (N=20); Type 6) smudge pits (N=17); Type 7) roasting pits (N=7); Type 8) fired surface areas (N=7); and Type 9) earth ovens (N=4). Detailed definitions for these feature types are presented by Cobb and Faulkner (1978) in the Owl Hollow report submitted to the National Science Foundation.

A total of 505 subsurface disturbances was classified as postholes. These were numerous over the site, but only in the Central and Eastern Expansion areas did there appear to be posthole patterns suggestive of structures. In the Central Expansion area postholes were extremely numerous and overlapping, suggesting that a number of structures had been rebuilt in approximately the same location. Postholes of uniform size, depth, fill coloration, and fill contents were used to identify at least one oval or circular structure in this area. Cobb and Faulkner (1978) suggest that this structure may have been a lightly built summer dwelling since it was of small size (approximately 20 feet), and had no interior support posts or earth ovens. In the Eastern Expansion area there were found several deep earth ovens and a number of large postholes that would have held interior house support posts. It was not possible to

define an exterior alignment of postholes which would have formed the outer house wall. Similar support post and earth oven arrangements have been found as part of winter houses at other Owl Hollow sites (Faulkner and McCollough 1974).

Ten 2x2 m excavation units and one 30x1 m wide trench were placed in the North Midden Expansion area to test the rich midden deposit found there. The midden deposit at its center was 30 cm thick and contained numerous well preserved artifactual and ecofactual remains. Gastropods (both terrestrial and aquatic) and pelecypods were especially numerous in the deposit. The midden was excavated in arbitrary 10 cm levels, with each level being waterscreened through a combination of 1/4 in and window screen mesh boxes. The faunal remains from four midden units and the trench were analyzed for this study. The midden deposit thinned out on its outer edges and appeared to have been formed originally from materials thrown into an erosional gully or natural swale.

Twelve radiocarbon dates were obtained from nine features and a midden unit (Table 18). The dates were from two features each in the Western and Central Expansion areas, five features in the Eastern Expansion area, and one feature from the North Midden area. Ten of the dates were calculated by the University of Georgia and two by Geochron Laboratories Division (Cobb and Faulkner 1978).

Two dates each were obtained from Features 53 and 73. For each feature, one of the dates was calculated by the University of Georgia and the other by Geochron. This was done to cross-check the accuracy

Table 18

40FR7 Radiocarbon Dates

Feature No.	Sample No.	Dates
West Expansion		
Feat. 10	UGa-1426	1415 ± 60 B.P. (A.D. 535)
Feat. 20	UGa-1566	1695 ± 85 B.P. (A.D. 255)
Central Expansion		
Feat. 53	UGa-1427	1385 ± 85 B.P. (A.D. 565)
Feat. 53	GX-4922	1165 ± 125 B.P. (A.D. 785)
Feat. 45	UGa-1567	1715 ± 65 B.P. (A.D. 235)
Eastern Expansion		
Feat. 65	UGa-1563	1875 ± 155 B.P. (A.D. 75)
Feat. 69	UGa-1568	1640 ± 65 B.P. (A.D. 310)
Feat. 73	UGa-1564	1855 ± 100 B.P. (A.D. 95)
Feat. 73	GX-4923	1320 ± 125 B.P. (A.D. 630)
Feat. 85	UGa-1565	1715 ± 65 B.P. (A.D. 235)
Feat. 96	UGa-1428	1675 ± 60 B.P. (A.D. 275)
North Midden Area		
Unit 100N x 54E		
Level I, 10-20 cm	UGa-1569	1725 ± 60 B.P. (A.D. 225)

of the dates received from the University of Georgia. As can be seen in Table 18, the Geochron dates in both instances were several hundred years more recent than those received from the University of Georgia. Cobb and Faulkner (1978) are uncertain why these inconsistencies occur, but they suggest that contamination of the features from later occupations may be a factor. In any case, the Geochron date does not represent the time age of these features based on other dates and cultural evidence.

The main occupation of 40FR7 is felt to be during the early Owl Hollow developmental period since 50% of the radiocarbon dates fall between A.D. 200 and A.D. 300. Two of the early dates, A.D. 75 for Feature 65 and A.D. 95 for Feature 73, are believed to be anomalous and too early for the cultural remains found in them (Cobb and Faulkner 1978). Features from the A.D. 200-300 period were found in all the expansion areas and the midden, thus establishing rough contemporaneity of occupation for all these areas. Cobb and Faulkner (1978) suggest that the later radiocarbon dates in the three expansion areas represent less intensive reoccupation of the site by middle and late Owl Hollow phase groups.

The faunal collections from 40FR7 are quite extensive and are made up of large numbers of vertebrate and invertebrate remains. Vertebrates from the site include the remains of mammals, birds, reptiles, amphibians, and fish. Invertebrate remains include freshwater pelecypods and gastropods, marine gastropods and terrestrial gastropods. The vertebrates will be considered first.

A total of 124,475 bone fragments was recovered from the features and midden units analyzed at 40FR7 (Table 19). The distribution and percentage of each vertebrate species found in the different excavation areas are shown in Tables 20 and 21. Mammal bone comprised the majority of the sample (91,315 fragments or 73.36% of the total). Of the 6,042 identifiable bones at the site, 1,588 were from mammals, representing at least 26 species. As can be seen in Table 19, based upon the amount of meat potentially contributed (1,231.6 pounds), mammals would have been the most important animal group in the 40FR7 Owl Hollow diet. The white-tailed deer was the major contributor to this total.

It is doubtful that all of the 26 species of mammals represented at the site were utilized by the Indians, as a number of them were most likely of natural occurrence there. The author believes that the following species naturally occurred at the site: eastern mole, least shrew, eastern chipmunk, white-footed/deer mouse, rice rat, eastern woodrat, and pine vole. The rodents may have been attracted to the site by stored human foods and garbage thrown into the open features and midden. Also, the human remains found at the site display no evidence of cannibalism and thus are not considered part of the Owl Hollow diet. These skeletal remains, however, do give some potentially interesting insights into Owl Hollow beliefs and behavior patterns; they will be discussed at the end of the 40FR7 overview.

The most numerous mammal remains in the sample were those of the

Table 19

Vertebrate Fauna Identified from the Owl Hollow Site (40FR7)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Opossum, *Didelphis marsupialis*	15	1	.24	8.50	.65
Eastern Mole, *Scalopus aquaticus*	5	1	.08	-	-
Least Shrew, *Cryptotis parva*	2	1	.03	-	-
Short-tailed Shrew, *Blarina brevicauda*	4	3	.06	-	-
Raccoon, *Procyon lotor*	61	6	1.00	105.00	8.03
Long-tailed Weasel, *Mustela frenata*	5	1	.08	.50	.03
Mink, *Mustela vison*	3	1	.04	1.00	.07
Otter, *Lutra canadensis*	1	1	.01	12.50	.95
Striped Skunk, *Mephitis mephitis*	23	2	.38	10.00	.76
Gray Fox, *Urocyon cinereoargenteus*	10	3	.16	13.50	1.03
Fox sp.	10	-	.16	-	-
Domestic Dog, *Canis familiaris*	181	4	2.99	34.00	2.60

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
cf. Domestic Dog, *Canis familiaris*	5	-	.08	-	-
Dog/Fox, Canidae	8	-	.13	-	-
Cougar, *Felis concolor*	1	1	.01	60.00	4.58
Woodchuck, *Marmota monax*	27	2	.44	11.20	.85
Eastern Chipmunk, *Tamias striatus*	15	2	.24	-	-
Gray Squirrel, *Sciurus carolinensis*	1	1	.01	.60	.04
Fox Squirrel, *Sciurus niger*	4	1	.06	1.30	.09
Gray/Fox Squirrel, *Sciurus* spp.	255	15	4.22	9.00	.68
Beaver, *Castor canadensis*	5	1	.08	38.50	2.94
White-footed/Deer Mouse, *Peromyscus* spp.	34	13	.56	-	-
Eastern Woodrat, *Neotoma floridana*	1	1	.01	-	-
Rice Rat, *Oryzomys palustris*	23	5	.38	-	-
Pine Vole, *Microtus pinetorum*	31	6	.51	-	-

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Vole, *Microtus* spp.	3	-	.04	-	-
Muskrat, *Ondatra zibethica*	4	1	.06	2.00	.15
Porcupine, *Erethizon dorsatum*	1	1	.01	10.00	.76
Small Rodents spp.	289	26	4.78	-	-
Cottontail, *Sylvilagus* cf. *floridanus*	149	8	2.46	14.00	1.07
White-tailed Deer, *Odocoileus virginianus*	389	9	6.43	900.00	68.84
Deer, Cervidae	3	-	.04	-	-
Human, *Homo sapiens*	20	2	.33	-	-
Total Ident. Mammal Bone Pieces	1,588	119	26.11	1,231.60	94.12
Indet. Large Mammal Bone Pieces	1,949				
Indet. Small Mammal Bone Pieces	87,778				
Total Mammal Bone	91,315				

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Birds					
Canada Goose, *Branta canadensis*	5	1	.08	5.60	.42
Duck sp.	1	1	.01	-	-
Hawk sp., cf. *Buteo* sp.	2	1	.03	-	-
Hawk sp.	1	1	.01	-	-
cf. Ruffed Grouse, *Bonasa umbellus*	1	1	.01	1.00	.07
Bobwhite, *Colinus virginianus*	8	2	.13	.52	.03
Turkey, *Meleagris gallopavo*	34	6	.56	51.00	3.90
Sandhill Crane, *Grus canadensis*	1	1	.01	6.00	.45
Passenger Pigeon, *Ectopistes migratorius*	1	1	.01	.41	.03
Mourning Dove, *Zenaida macroura*	1	1	.01	.20	.01
Screech Owl, *Otis asio*	2	1	.03	-	-
Small Owl sp.	1	-	.01	-	-
Common Crow, *Corvus brachyrhynchos*	1	1	.01	-	-
Passerine spp.	9	2	.14	-	-

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total Ident. Bird Bone Pieces	68	20	1.05	64.73	4.91
Indet. Bird Bone Pieces	5,574				
Total Bird Bone	5,642				
Reptiles					
Snapping Turtle, *Chelydra serpentina*	2	1	.03	7.50	.57
Stinkpot, *Sternotherus odoratus*	5	2	.08	-	-
Mud Turtle, *Kinosternon subrubrum*	8	3	.13	-	-
Turtle: Kinosternidae	271	6	4.48	-	-
Box Turtle, *Terrapene carolina*	344	5	5.69	2.00	.15
Turtle: *Graptemys*/ *Chrysemys* spp.	12	1	.19	1.50	.11
Softshell Turtle, *Trionyx* spp.	32	2	.52	-	-
Turtle, spp.	793	-	13.12	-	-
Snake: Colubridae	314	3	5.19	-	-
Snake: Crotalidae	26	1	.43	-	-

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Snake, spp.	1,437	-	23.78	-	-
Total Ident. Reptile Bone Pieces	3,244	24	53.64	11.00	.83
Amphibians					
Hellbender, *Cryptobranchus alleganiensis*	75	4	1.24	-	-
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	122	11	2.01	-	-
Toad, *Bufo* sp.	32	6	.52	-	-
Toad, *Scaphiopus/Bufo* spp.	100	-	1.65	-	-
Frog, *Rana* spp.	58	4	.95	-	-
Toad/Frog spp.	164	-	2.71	-	-
Total Ident. Amphibian Bone Pieces	551	25	9.08	-	-

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Fish					
Gar, *Lepisosteus* spp.	9	2	.14	-	-
Pike, *Esox* spp.	2	1	.03	-	-
Common Stoneroller, *Campostoma anomalum*	6	4	.09	-	-
Minnow, cf. *Phenacobius* sp.	1	1	.01	-	-
Creek Chub, *Semotilus atromaculatus*	3	2	.04	-	-
Creek Chub/Shiner, *Semotilus atromaculatus*/ *Notropis* spp.	3	3	.04	-	-
Chub, *Nocomis* spp.	15	8	.24	-	-
Chub, cf. *Nocomis* sp.	1	1	.01	-	-
Shiner, *Notropis* spp.	6	3	.09	-	-
Minnow spp., Cyprinidae	19	7	.31	-	-
Buffalo, *Ictiobus* spp.	4	2	.06	-	-
Northern Hogsucker, *Hypentelium nigracans*	2	1	.03	-	-

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Redhorse, *Moxostoma* spp.	74	11	1.22	-	-
Sucker spp., Catostomidae	221	19	3.65	-	-
Catfish, *Ictalurus* spp.	9	3	.14	-	-
Catfish spp., Ictaluridae	17	4	.28	-	-
Bass, *Micropterus* spp.	5	2	.08	-	-
Sunfish, *Lepomis* sp.	1	1	.01	-	-
Sunfish spp., Centrarchidae	170	17	2.81	-	-
Freshwater Drum, *Aplodinotus grunniens*	23	6	.38	-	-
Total Ident. Fish Bone Pieces	591	98	9.66	-	-
Indet. Fish Bone Pieces	23,132				
Total Fish Bone	23,723				
Total All Ident. Bone	6,042	286	99.54	1307.33	99.86

Table 19 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total All Indet. Bone	118,433				
Total All Bone	124,475				

Table 20

Vertebrate Fauna Identified from the Owl Hollow Site (40FR7) by Excavation Area

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Mammals						
Opossum, *Didelphis marsupialis*	8	-	1	4	2	15
Eastern Mole, *Scalopus aquaticus*	2	-	-	2	1	5
Least Shrew, *Cryptotis parva*	2	-	-	-	-	2
Short-tailed Shrew, *Blarina brevicauda*	3	-	-	1	-	4
Raccoon, *Procyon lotor*	28	-	9	13	11	61
Long-tailed Weasel, *Mustela frenata*	4	-	-	1	-	5
Mink, *Mustela vison*	3	-	-	-	-	3
Otter, *Lutra canadensis*	-	-	-	1	-	1
Striped Skunk, *Mephitis mephitis*	16	2	2	3	-	23
Gray Fox, *Urocyon cinereoargenteus*	8	-	1	1	-	10
Fox sp.	2	-	4	2	2	10
Domestic Dog, *Canis familiaris*	127	-	51	2	1	181

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
cf. Domestic Dog, *Canis familiaris*	4	-	-	1	-	5
Dog/Fox, Canidae	5	-	-	1	2	8
Cougar, *Felis concolor*	-	-	1	-	-	1
Woodchuck, *Marmota monax*	19	-	3	3	2	27
Eastern Chipmunk, *Tamias striatus*	15	-	-	-	-	15
Gray Squirrel, *Sciurus carolinensis*	1	-	-	-	-	1
Fox Squirrel, *Sciurus niger*	3	-	1	-	-	4
Gray/Fox Squirrel, *Sciurus* spp.	148	12	41	36	18	255
Beaver, *Castor canadensis*	3	-	-	2	-	5
White-footed/Deer Mouse, *Peromyscus* spp.	25	-	6	1	2	34
Eastern Woodrat, *Neotoma floridana*	1	-	-	-	-	1
Rice Rat, *Oryzomys palustris*	15	-	4	4	-	23
Pine Vole, *Microtus pinetorum*	14	5	9	1	2	31

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Vole, *Microtus* spp.	-	-	3	-	-	3
Muskrat, *Ondatra zibethica*	1	-	1	2	-	4
Porcupine, *Erethizon dorsatum*	-	-	1	-	-	1
Small Rodents spp.	186	4	45	35	19	289
Cottontail, *Sylvilagus* cf. *floridanus*	82	8	25	25	9	149
White-tailed Deer, *Odocoileus virginianus*	160	13	106	83	27	389
Deer, Cervidae	-	-	2	1	-	3
Human, *Homo sapiens*	10	-	2	1	7	20
Total Ident. Mammal Bone Pieces	895	44	318	226	105	1,588
Indet. Large Mammal Bone Pieces	684	87	612	395	171	1,949
Indet. Small Mammal Bone Pieces	47,842	4,149	16,203	14,449	5,135	87,778
Total Mammal Bone	49,421	4,280	17,133	15,070	5,411	91,315

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Birds						
Canada Goose, *Branta canadensis*	4	-	-	1	-	5
Duck sp.	-	-	1	-	-	1
Hawk sp., cf. *Buteo* sp.	-	-	2	-	-	2
Hawk sp.	1	-	-	-	-	1
cf. Ruffed Grouse, *Bonasa umbellus*	-	-	-	-	1	1
Bobwhite, *Colinus virginianus*	7	-	-	1	-	8
Turkey, *Meleagris gallopavo*	14	-	7	6	7	34
Sandhill Crane, *Grus canadensis*	-	-	1	-	-	1
Passenger Pigeon, *Ectopistes migratorius*	1	-	-	-	-	1
Mourning Dove, *Zenaida macroura*	1	-	-	-	-	1
Screech Owl, *Otis asio*	-	-	2	-	-	2
Small Owl sp.	-	-	1	-	-	1
Common Crow, *Corvus brachyrhynchos*	1	-	-	-	-	1
Passerine spp.	5	-	2	2	-	9

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Total Ident. Bird Bone Pieces	34	-	16	10	8	68
Indet. Bird Bone Pieces	3,179	114	606	1,285	390	5,574
Total Bird Bone	3,213	114	622	1,295	398	5,642
Reptiles						
Snapping Turtle, *Chelydra serpentina*	2	-	-	-	-	2
Stinkpot, *Sternotherus odoratus*	3	-	1	1	-	5
Mud Turtle, *Kinosternon subrubrum*	4	-	2	2	-	8
Turtle: Kinosternidae	144	2	51	44	30	271
Box Turtle, *Terrapene carolina*	184	9	66	52	33	344
Turtle: *Graptemys*/ *Chrysemys* spp.	8	-	-	3	1	12
Softshell Turtle, *Trionyx* spp.	25	2	3	-	2	32
Turtle, spp.	308	13	229	182	61	793
Snake: Colubridae	254	3	26	19	12	314
Snake: Crotalidae	15	-	3	1	7	26

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Snake, spp.	1,049	20	142	102	124	1,437
Total Ident. Reptile Bone Pieces	1,996	49	523	406	270	3,244
Amphibians						
Hellbender, *Cryptobranchus alleganiensis*	36	2	15	8	14	75
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	80	2	27	5	8	122
Toad, *Bufo* sp.	17	6	5	3	1	32
Toad, *Scaphiopus*/*Bufo* spp.	71	3	11	12	3	100
Frog, *Rana* spp.	34	3	11	1	9	58
Toad/Frog spp.	121	5	22	5	11	164
Total Ident. Amphibian Bone Pieces	359	21	91	34	46	551

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Fish						
Gar, *Lepisosteus* spp.	7	-	1	-	1	9
Pike, *Esox* spp.	2	-	-	-	-	2
Common Stoneroller, *Campostoma anomalum*	6	-	-	-	-	6
Minnow, cf. *Phenacobius* sp.	1	-	-	-	-	1
Creek Chub, *Semotilus atromaculatus*	3	-	-	-	-	3
Creek Chub/Shiner, *Semotilus atromaculatus*/ *Notropis* spp.	1	-	-	-	2	3
Chub, *Nocomis* spp.	15	-	-	-	-	15
Chub, cf. *Nocomis* sp.	1	-	-	-	-	1
Shiner, *Notropis* spp.	6	-	-	-	-	6
Minnow spp., Cyprinidae	15	-	3	-	1	19
Buffalo, *Ictiobus* spp.	2	-	1	-	1	4

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Northern Hogsucker, *Hypentelium nigracans*	1	-	1	-	-	2
Redhorse, *Moxostoma* spp.	47	1	8	6	12	74
Sucker spp., Catostomidae	132	2	27	15	45	221
Catfish, *Ictalurus* spp.	5	-	3	-	1	9
Catfish spp., Ictaluridae	10	-	-	2	5	17
Bass, *Micropterus* spp.	2	-	1	-	2	5
Sunfish, *Lepomis* sp.	1	-	-	-	-	1
Sunfish spp., Centrarchidae	105	3	10	23	29	170
Freshwater Drum, *Aplodinotus grunniens*	11	1	5	6	-	23
Total Ident. Fish Bone Pieces	373	7	60	52	99	591
Indet. Fish Bone Pieces	16,583	184	2,322	1,852	2,191	23,132
Total Fish Bone	16,956	191	2,382	1,904	2,290	23,723

Table 20 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features	Total All Areas
Total All Ident. Bone	3,657	121	1,008	728	528	6,042
Total All Indet. Bone	68,288	4,534	19,743	17,981	7,887	118,433
Total All Bone	71,945	4,655	20,751	18,709	8,415	124,475

Table 21

Percentages of Identifiable Vertebrate Fauna from the Owl Hollow Site (40FR7) by Excavation Area

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Mammals					
Opossum, *Didelphis marsupialis*	.21	-	.09	.54	.37
Eastern Mole, *Scalopus aquaticus*	.05	-	-	.27	.18
Least Shrew, *Cryptotis parva*	.05	-	-	-	-
Short-tailed Shrew, *Blarina brevicauda*	.08	-	-	.13	-
Raccoon, *Procyon lotor*	.76	-	.89	1.78	2.08
Long-tailed Weasel, *Mustela frenata*	.10	-	-	.13	-
Mink, *Mustela vison*	.08	-	-	-	-
Otter, *Lutra canadensis*	-	-	-	.13	-
Striped Skunk, *Mephitis mephitis*	.43	1.65	.19	.41	-
Gray Fox, *Urocyon cinereoargenteus*	.21	-	.09	.13	-
Fox sp.	.05	-	.39	.27	.37
Domestic Dog, *Canis familiaris*	3.47	-	5.05	.27	.18

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
cf. Domestic Dog, *Canis familiaris*	.10	-	-	.13	-
Dog/Fox, Canidae	.13	-	-	.13	.37
Cougar, *Felis concolor*	-	-	.09	-	-
Woodchuck, *Marmota monax*	.51	-	.29	.41	.37
Eastern Chipmunk, *Tamias striatus*	.41	-	-	-	-
Gray Squirrel, *Sciurus carolinensis*	.02	-	-	-	-
Fox Squirrel, *Sciurus niger*	.08	-	.09	-	-
Gray/Fox Squirrel, *Sciurus* spp.	4.04	9.91	4.06	4.94	3.40
Beaver, *Castor canadensis*	.08	-	-	.27	-
White-footed/Deer Mouse, *Peromyscus* spp.	.68	-	.59	.13	.37
Eastern Woodrat, *Neotoma floridana*	.02	-	-	-	-
Rice Rat, *Oryzomys palustris*	.41	-	.39	.54	-
Pine Vole, *Microtus pinetorum*	.38	4.13	.89	.13	.37

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Vole, *Microtus* spp.	-	-	.29	-	-
Muskrat, *Ondatra zibethica*	.02	-	.09	.27	-
Porcupine, *Erethizon dorsatum*	-	-	.09	-	-
Small Rodents spp.	5.08	3.30	4.46	4.80	3.59
Cottontail, *Sylvilagus* cf. *floridanus*	2.24	6.61	2.48	3.43	1.70
White-tailed Deer, *Odocoileus virginianus*	4.37	10.74	10.51	11.40	5.11
Deer, Cervidae	-	-	.19	.13	-
Human, *Homo sapiens*	.27	-	.19	.13	1.32
Total Ident. Mammal Bone Pieces	24.33	36.34	31.40	30.90	19.78
Birds					
Canada Goose, *Branta canadensis*	.10	-	-	.13	-
Duck sp.	-	-	.09	-	-

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Hawk sp., cf. *Buteo* sp.	-	-	.19	-	-
Hawk sp.	.02	-	-	-	-
cf. Ruffed Grouse, *Bonasa umbellus*	-	-	-	-	.18
Bobwhite, *Colinus virginianus*	.19	-	-	.13	-
Turkey, *Meleagris gallopavo*	.38	-	.69	.82	1.32
Sandhill Crane, *Grus canadensis*	-	-	.09	-	-
Passenger Pigeon, *Ectopistes migratorius*	.02	-	-	-	-
Mourning Dove, *Zenaida macroura*	.02	-	-	-	-
Screech Owl, *Otis asio*	-	-	.19	-	-
Small Owl sp.	-	-	.09	-	-
Common Crow, *Corvus brachyrhynchos*	.02	-	-	-	-
Passerine spp.	.13	-	.19	.27	-
Total Ident. Bird Bone Pieces	.88	-	1.53	1.35	1.50

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Reptiles					
Snapping Turtle, *Chelydra serpentina*	.05	-	-	-	-
Stinkpot, *Sternotherus odoratus*	.08	-	.09	.13	-
Mud Turtle, *Kinosternon subrubrum*	.10	-	.19	.27	-
Turtle: Kinosternidae	3.93	1.65	5.05	6.04	5.68
Box Turtle, *Terrapene carolina*	5.03	7.43	6.54	7.14	6.25
Turtle: *Graptemys*/ *Chrysemys* spp.	.21	-	-	.41	.18
Softshell Turtle, *Trionyx* spp.	.68	1.65	.29	-	.37
Turtle, spp.	8.42	10.74	22.71	25.00	11.55
Snake: Colubridae	6.94	2.47	2.57	2.60	2.27
Snake: Crotalidae	.41	-	.29	.13	1.32
Snake, spp.	28.68	16.52	14.08	14.01	23.48
Total Ident. Reptile Bone Pieces	54.53	40.46	51.81	55.73	51.10

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Amphibians					
Hellbender, *Cryptobranchus alleganiensis*	.98	1.65	1.48	1.09	2.65
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	2.18	1.65	2.67	.68	1.51
Toad, *Bufo* spp.	.46	4.95	.49	.41	.18
Toad, *Scaphiopus/Bufo* spp.	1.94	2.47	1.09	1.64	.56
Frog, *Rana* spp.	.92	2.47	1.09	.13	1.70
Toad/Frog spp.	3.30	4.13	2.18	.68	2.08
Total Ident. Amphibian Bone Pieces	9.78	17.32	9.00	4.63	8.68
Fish					
Gar, *Lepisosteus* spp.	.19	-	.09	-	.18
Pike, *Esox* spp.	.05	-	-	-	-
Common Stoneroller, *Campostoma anomalum*	.16	-	-	-	-

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Minnow, cf. *Phenacobius* sp.	.02	-	-	-	-
Creek Chub, *Semotilus atromaculatus*	.08	-	-	-	-
Creek Chub/Shiner, *Semotilus atromaculatus*/ *Notropis* spp.	.02	-	-	-	.37
Chub, *Nocomis* spp.	.41	-	-	-	-
Chub, cf. *Nocomis* sp.	.02	-	-	-	-
Shiner, *Notropis* spp.	.16	-	-	-	-
Minnow spp., Cyprinidae	.41	-	.29	-	.18
Buffalo, *Ictiobus* spp.	.05	-	.09	-	.18
Northern Hogsucker, *Hypentelium nigracans*	.02	-	.09	-	-
Redhorse, *Moxostoma* spp.	1.28	.82	.79	.82	2.27
Sucker spp., Catostomidae	3.60	1.65	2.67	2.06	8.52
Catfish, *Ictalurus* spp.	.13	-	.29	-	.18
Catfish, Ictaluridae	.27	-	-	.27	.94

Table 21 (continued)

Species	Midden	Western Expansion	Central Expansion	Eastern Expansion	Misc. Features
Bass, *Micropterus* spp.	.05	-	.09	-	.37
Sunfish, *Lepomis* sp.	.02	-	-	-	-
Sunfish spp., Centrarchidae	2.87	2.47	.99	3.15	5.49
Freshwater Drum, *Aplodinotus grunniens*	.30	.82	.49	.82	-
Total Ident. Fish Bone Pieces	10.11	5.76	5.88	7.12	18.68
Total All Ident. Bone	99.63	99.88	99.62	99.73	99.74

white-tailed deer (389 pieces). There were at least nine individual deer represented in this sample. As was stated earlier, these nine individuals represent 68.79% of the total calculable meat based on the recovered bone sample. It would appear that the entire carcass of the deer was returned to the site since nearly all deer skeletal elements were represented in the collection. The white-tailed deer was obviously one of the most sought after and valuable animals in the Owl Hollow diet.

Other important mammals in the diet included the opossum, raccoon, gray fox, woodchuck, squirrels, beaver, muskrat, porcupine, cottontail, and possibly the various mustelids. The raccoon is very well represented in the collection with 61 skeletal elements from at least six individuals. Squirrel remains are also very common in the faunal sample but most (255 pieces) could not be specifically labeled either gray or fox squirrel since it is very difficult to identify fragmentary remains. However, one maxilla was identified as being from a gray squirrel since it had the five cheek teeth common to that species, and four long bones, due to their extremely large size, were identified as fox squirrel. There was a minimum of 15 individuals represented in the gray/fox squirrel category. In calculating the estimated usable meat for these animals the average .6 pounds available from the gray squirrel was used as the standard (Parmalee 1965).

The cottontail rabbit was commonly utilized. A minimum of eight individuals was identified from the 149 total cottontail remains.

Less numerous, but also important in terms of the amount of meat that each could contribute to the diet were the opossum, gray fox, woodchuck, beaver, muskrat, and porcupine. Except for the gray fox and the woodchuck, which have MNI counts of 3 and 2 respectively, the remaining mammal species are represented by single individuals.

The porcupine was identified from a right mandibular incisor found in Posthole 310 in the Central Expansion area. The porcupine is an animal that is rarely encountered in Tennessee faunal samples. Historically the animal was extirpated in Tennessee and only 17 specimens, including the one from 40FR7, have been recovered from archeological and paleontological sites in the state (Robison n.d.). The appearance of the porcupine at the Owl Hollow site marks the most recent occurrence of the animal in Tennessee. Porcupines, when encountered, would almost certainly have been taken for their meat and quills.

Mustelid remains are particularly well represented at the Owl Hollow site with skeletal elements from the long-tailed weasel, mink, otter, and striped skunk being present. All these animals may have been utilized as food resources, but they may have also been desired for their pelts. In the winter the weasel, mink, and otter have extremely fine and thick pelts. The fur of their odoriferous cousin, the striped skunk, does not appear to have been used historically, but its scent gland was utilized to ward off diseases from Cherokee Indian homes (Mooney 1900).

A single cougar element (the burned head and neck of a right

femur) was found at 40FR7; this specimen occurred in Posthole 116 in the Central Expansion area. This element was the only evidence of cougar found at any of the sites examined for the Owl Hollow or Normandy projects. This is not surprising, though, since the cougar is an elusive, rarely seen animal with a large territory sometimes encompassing up to 100 square miles (Schwartz and Schwartz 1959). Historically the cougar has been recorded as a food resource (Swanton 1946), but it is equally likely that this felid was seen as a prize trophy by the Owl Hollow Indians. Most historic Indians revered animals which displayed ferocity and skill as hunters (Swanton 1946: 440).

There were at least 181 domestic dog skeletal elements identified at 40FR7. A majority of these, 127, were from the midden units. Dog remains at 40FR7 present a confusing picture of the dog's place in the Owl Hollow society. The remains of a dog which had been badly disturbed and broken by historic plowing were found in units 97N52E and 98N52E. Sufficient matching elements were found in close enough proximity to suggest that the complete animal had been placed in the midden, if not purposely buried. In another midden unit, 98N48E, a right dog femur (minus the head and a portion of the neck) was found that had two heavy cut marks on the lateral side of the bone, just below the neck. Cut marks at this position suggest that the animal was butchered for consumption. The cuts would have been made while removing the leg from the pelvis. While no other butchering cuts were found on dog bones, the isolated and scattered

nature of most of these canid remains at least suggests that they were from animals that had been disarticulated prior to deposition in the midden and other site features.

It is highly probable that the dog was utilized at least on occasion as a supplemental meat resource. Whether this would have been on a regular basis or only for festive occasions is unknown. The dog that was placed whole into the midden may have been an animal that died of natural causes and was not considered fit to eat. At least four dogs were represented by the remains recovered from 40FR7. Five additional canid remains could be identified only as cf. Canis familiaris. Three of these elements are from an immature canid, probably a still born pup.

The 5,642 bird remains in the 40FR7 faunal sample made up only 4.53% of the total bone recovered from the site. Only 68 of the bird elements could be identified more specifically; these were from at least 12 different species.

Five Canada goose skeletal elements were found at the site, four were from the midden and one was from the Eastern Expansion area. A left humerus shaft from an unidentified species of duck was recovered from the Central Expansion area. These six skeletal elements represent the total collection of waterfowl remains from the site. This lack of waterfowl is not unexpected since the upper Elk River is not on one of the major flyways. During the major waterfowl migrations in the spring and autumn, only stragglers may have passed through the site area. The principal migration corridors for most

geese and ducks are farther to the west along the Mississippi River (Bellrose 1976). Only wood ducks and giant Canada geese traditionally nested in this region. Waterfowl appear to have been taken when they were encountered, but they were evidently not numerous enough to be more than sporadic supplements to the diet.

Birds of prey are represented at the site by hawks and owls. Three hawk skeletal remains were identified. Two were ungual phalanges thought to be from a species of Buteo hawk. Four Buteo hawk species may occur in the project area; these include the red-tailed, red-shouldered, broad-winged, and rough-legged hawks. A fragmentary phalanx 2 was from a smaller indeterminate hawk species, one comparable in size to a sharp-shinned or Cooper's hawk. The feathers of hawks and eagles were highly valued by many southeastern Indian groups and were often worn as decorative items (Swanton 1946).

Owls are also represented by three skeletal elements. Two, an ulna and a phalanx 1, are definitely from a screech owl, while the third, an ungual phalanx, may be from either a screech or a saw-whet owl. Although owls and hawks may have been Owl Hollow dietary items, Adair (1930) notes that some historic southeastern groups considered them unclean and inedible.

Gallinaceous bird remains are the most common at the site. These include skeletal elements from grouse, bobwhite quail and turkey. In the eastern United States gallinaceous birds most commonly inhabit open or "edge" habitats, such as clearings in the woods or abandoned fields.

Turkey skeletal elements, 34 from six individuals, make up a majority of the identifiable bird remains. Since seven turkey tarsometatarsi with spurs were recovered at the site, and generally only males possess fully developed spurs, it is believed that there were at least four gobblers present in the sample. Based upon the frequency of capture and the amount of meat which could potentially be gained per individual (8.5 pounds), the turkey was probably one of the more significant meat resources to the inhabitants of 40FR7.

Although they occur in similar habitats, the remains of bobwhite quail and grouse appear much less frequently in the faunal collection than those of the turkey. Even so, the bobwhite quail, with eight skeletal elements from at least two individuals, was the second most common species of bird present at 40FR7. The single grouse element recovered from the site was not complete enough for a definitive species identification; however, based upon the current distribution of different grouse species, it is probably from a ruffed grouse.

One of the bird species found at 40FR7, the passenger pigeon, is extinct, and another, the sandhill crane, has been nearly extirpated in the eastern United States. The passenger pigeon, whose great migratory flocks were said to darken the sky when they passed overhead, was represented in the 40FR7 faunal collection by only a single element, a scapula found in the midden. This migratory bird is reported to have nested in the northern United States and eastern Canada in the spring and summer and to have passed the autumn and winter months in the southeastern U.S. (Schorger 1955). No records

could be found that any major roosts were located in the state. Information on migration corridors, if they existed, is scarce. It is possible that the passenger pigeon was not a common visitor to the upper Elk and Duck river valleys. Only one other passenger pigeon element has been recorded from this region; this element was found at 40CF111 in the Normandy Reservoir and was associated with an early Mississippian feature (Robison 1978).

The passenger pigeon was not the only member of the family Columbidae found at the site; a tarsometatarsus from a mourning dove was also identified. Although the mourning dove is a popular game bird today, it does not seem to have been taken with any frequency by the Owl Hollow hunters. Perhaps the mourning dove in the past was not as common in this region; the species generally prefers to live in relatively open country with just a few trees in which to perch (Bent 1932). Since the region around 40FR7 was probably more thickly forested than today, fewer mourning doves may have been available for exploitation.

A radius shaft fragment from a sandhill crane was recovered from 40FR7. Currently only two resident populations of sandhill cranes can be found in the eastern United States, one small group in Mississippi and another in Florida and southern Georgia. Both these groups are sedentary. Most of the migratory sandhill cranes occur in the western United States, but a few which nest near the Great Lakes migrate through Tennessee to winter in Florida (Terres 1980). The sandhill crane at 40FR7 was either a part of a more numerous and geographically expanded local population or a migrant.

Ten skeletal elements from passerine birds were found at 40FR7. Only one of these was identifiable to the species level; this was a tarsometatarsus from the common crow. The crow could have been a dietary item or the feathers may also have been used for some ritual or decorative purpose. The remaining nine bones were very fragmentary and could only be categorized as being from representatives of the order Passeriformes. All are of very small size and it is doubtful they were utilized as a food resource. Since many of the "perching birds" are brightly colored they may have been taken for their plummage.

A total of 351 fragments of bird egg shell was found in the fine water screen materials. The majority of the egg shells, 248 fragments or 70.65% of the total, was recovered from the midden units. The remainder was found in features and postholes in the Central and Western Expansion areas and in several features outside the major excavation areas. Egg shell was numerous enough and spread over a wide enough area of the site to suggest that eggs were a relatively common dietary supplement. It may be assumed that eggs were taken from bird nests when they were encountered during hunting or gathering expeditions outside the camp during the spring and early summer. The egg shell fragments gave no clue as to what birds may have laid them.

There was a total of 3,244 reptile bones in the faunal sample. These remains made up only 2.60% of the total bone from the site, but 53.64% of the identifiable vertebrate remains. The reptile remains

found at 40FR7 may be broken into two major categories, turtles and snakes. At least six species of turtles and two species of snakes were present at the site. Five of the turtles are aquatic species and one is terrestrial. The majority of the turtle remains (793 elements) were too fragmentary to be identified more specifically than turtle species.

The aquatic species include the snapping turtle, stinkpot, mud turtle, Graptemys/Chrysemys spp., and the softshell turtle. The 271 bone fragments classified as belonging to the family Kinosternidae were either nondiagnostic or too fragmentary to be identified as either Kinosternon or Sternotherus. Since aquatic turtles are usually extremely skittish and flee at the approach of man, they may have been captured in fish nets or traps more often than by hand.

The most common turtle remains at the site were those from the terrestrial box turtle. A majority of the 344 elements from this species were carapace or plastron fragments; at least five individuals were represented in the sample. The box turtle is quite docile, easily picked up, and it should have been common in the wooded areas near the Owl Hollow site.

The identifiable snake elements could only be classified as non-poisonous (Colubridae) snakes or poisonous (Crotalidae) snakes. These identifications were made principally on vertebrae; the major trunk vertebrae of poisonous snakes possess a pronounced haemal spine or process while those of non-poisonous snakes do not. Approximately 20 species of colubrid snakes and three species of crotalid snakes

may have occurred in the project area. The majority of the snake remains (1,437 elements) found at the site consisted of fragmentary vertebrae and ribs and could only be identified as "snake species". Snakes would probably have been only supplements to the diet.

A total of 551 amphibian remains was identified in the 40FR7 faunal collection. This was 9.08% of the identifiable bone, but only .44% of the total site bone. There were at least four genera of amphibians present in the collection, but only two of these could be identified to the species level. These were the hellbender and the eastern spadefoot toad.

Seventy-five skeletal remains from the hellbender were found at 40FR7. The hellbender is a completely aquatic animal that inhabits stream bottoms. This species could have been captured by hand or in fish nets or traps. While the hellbender is today thought an ugly, slimy, unappetizing creature, its remains are found with enough frequency at Owl Hollow sites to suggest that it was considered a supplement in the Indian diet.

Toad and frog remains are quite numerous in the 40FR7 faunal collection; they made up 476 of the total 551 amphibian bones. Complete or nearly complete bones can generally be identified at least as being from a toad or frog, but fragmentary elements are not so easily separated. One hundred and sixty-four of the amphibian skeletal elements could be identified only as Toad/Frog spp.

The eastern spadefoot toad, with 122 skeletal elements from at least 11 individuals, is the most common of the toad species.

Bufonid toads are represented by 32 elements from at least six individuals. There are an additional 100 toad postcranial remains which were too fragmentary to identify more specifically than Scaphiopus/Bufo sp. It is doubtful that any of the toads found at 40FR7 were utilized by the Indians; all are probably of natural occurrence at the site. The majority of the toad remains (204 out of 329 elements) were found in the midden. The toads were probably drawn there by the abundant insects which would have infested the garbage deposit.

Fifty-eight bones from at least four ranid frogs were noted in the faunal collections. Since leopard frogs often wander considerable distances from water it was not possible to determine whether these frogs were brought to the site as food items or were natural inclusions.

The 23,723 fish remains found at 40FR7 made up 19% of the total site faunal collection. Only 591 of these skeletal remains could be more specifically identified; these were from at least 14 different species of fish. The fish species from 40FR7 may be grouped into categories based upon the relationships of the species to each other and the environments they inhabit.

Minnows make up one of the most numerous of these categories; there were 54 minnow skeletal remains in the faunal sample from at least five different species, Campostoma anomalum, cf. Phenacobius sp., Semotilus atromaculatus, Nocomis sp., and Notropis sp. Most species identifications were based on phryngeal arches. The exact

use that the Owl Hollow peoples made of the minnows remains in question. Minnows could easily have been used as a minor food resource, much as sardines are today. Or they could have been unintentionally caught while using nets or traps to catch larger fish species. And, as suggested previously, they could also have been part of the discarded stomach contents from larger predatory fish that were returned to the camp for cleaning.

The most numerous fish remains at the site were from individuals of the family Catostomidae, the suckers. There were 182 skeletal elements from these fish found at the site. Fifty of these elements could be identified to at least the genus level: Ictiobus, Hypentelium, and Moxostoma. But the majority could be classified only as Catostomidae due to their fragmentary condition. Suckers are bottom feeders that would have been most easily caught during the spring months when they congregate in shallow waters during their spring spawning runs.

Additional bottom feeding fish utilized by the site inhabitants include catfish and the freshwater drum. There were 26 catfish remains found at the site. Nine of these could be identified as belonging to the genus Ictalurus while 17 could be determined only as ictalurids. The freshwater drum was represented in the collection by 23 elements. Ictalurids are by nature more solitary than catostomid fishes and would have been more difficult to catch in large numbers. The freshwater drum, however, can be found in schools; the reason for its minor representation in the faunal sample is unknown.

The second most numerous group of fish in the sample was the family Centrarchidae, the sunfishes. However, only six of the 176 centrarchid remains could be specifically identified. Five of these were from bass, (Micropterus sp.) and one from a sunfish, (Lepomis sp.). Thirteen species of centrarchids are presently known to occur in the Elk River. As with the catfish and freshwater drum, most sunfish species are rather solitary by nature. Their abundance in the faunal sample must be due to an emphasis which was put on their capture.

Gar and pike remains were also found at the site, nine and two elements respectively. It was not possible in either case to make species identifications. Three species of gar, Lepisosteus oculatus, L. osseus, and L. platostomus, are noted by Jandebeur (1972) as occurring in the Elk River. He does not, however, mention that any species of Esocidae have been collected from this stream or its tributaries. These 40FR7 specimens then would constitute the first occurrence for the Elk River. Three species of pike are noted as presently being found in Tennessee rivers; these are: Esox americanus, E. masquinongy and E. niger. Both E. americanus and E. niger have been taken in the Duck River (Nieland n.d.); it is likely that the skeletal elements from 40FR7 are from one of these species.

Both the gars and the pikes are predatory fish that hunt their prey by ambush. Each group inhabits different types of quiet waters. Gars are most often found in warm, sluggish backwaters of lowland rivers and lakes, while pikes are generally seen in clear, often cool

waters where the vegetation is abundant (Pflieger 1975). Neither group was well represented in the 40FR7 faunal collection, but their presence points out that the Owl Hollow fishermen were utilizing a number of different riverine habitats.

A total of 3,054 fish scale fragments was recovered from 40FR7. Fish scales were found in all areas of the site, but the majority were from the midden and the features outside the major excavation areas (1,188 fish scale fragments were found in Feature 109). Most of the fish scales were too fragmentary to determine the fish species from which they originated. Some of the more complete examples, however, appear to be large cycloid scales such as would be found on catostomid fishes.

As was stated earlier, mollusk remains are extremely numerous at 40FR7. These include freshwater pelecypods and gastropods, marine gastropods and terrestrial gastropods. Freshwater pelecypods will be discussed first.

Sixteen species of freshwater mussels were recovered from the archeological deposits at 40FR7 (Table 22). Sixty mussel species or forms were known to exist in the Elk River and 33 of these were collected from within the portion of the river that now forms the Tims Ford Reservoir (Isom et al. 1973; Ahlstedt 1983). All of the mussel species found at 40FR7 have been previously recorded for the Elk River. Most all the valves recovered were small, compressed forms from mussel species most common to river headwaters or larger creeks. Five species, Fusconaia barnesiana, Elliptio dilatata,

Table 22

Pelecypoda from the Owl Hollow Site (40FR7)

Species	Valves	MNI	Percent Of Total
Fusconaia barnesiana*	319	169	14.70
Lexingtonia dolabelloides*	59	38	2.72
Fusconaia/Lexingtonia sp.	37	26	1.70
Quadrula cylindrica	1	1	.04
Pleurobema oviforme*	6	4	.27
Elliptio dilatata	153	81	7.05
Pegias fabula*	34	21	1.56
Strophitis undulatus	4	3	.18
Ptychobranchus fasciolare	4	2	.18
Ptychobranchus subtentum*	517	260	23.83
Actinonaias pectorosa*	9	5	.41
Medionidus conradicus*	306	180	14.10
Villosa taeniata*	67	39	3.08
Villosa vanuxemensis*	17	10	.78
Villosa sp.	482	245	22.22
Villosa sp./Epioblasma capsaeformis	82	43	3.78
Lampsilis ovata	6	3	.27
Lampsilis fasciola	52	28	2.39
Epioblasma capsaeformis*	14	9	.64

Table 22 (continued)

Species	Valves	MNI	Percent Of Total
Total Ident. Pelecypods	2,169	1,167	99.90

* Cumberlandian species.

Ptychobranchus subtentum, Medionidus conradicus, and Villosa sp., make up 81.90% of the total analyzed mussel shell sample.

Fusconaia barnesiana is most common in small river and stream habitats; Warren (1975) notes that this species has only rarely been found in larger rivers, most notably in the Tennessee River at Muscle Shoals. Generally this species is found nestled in a gravel substrate in water with a strong current at depths of 1/2 to 3 feet (Warren 1975). The F. barnesiana valves from 40FR7 are small compressed specimens typically of small streams and headwater areas.

Elliptio dilatata is found in large and small rivers and in creeks. Parmalee (1967) states that ". . . this mussel thrives best in a sand/gravel bottom, in riffles or in rivers with strong current." Specimens may be found in both shallow and deeper water, generally 6 to 8 ft maximum. The valves found at 40FR7 are small and compressed forms, obviously from a small stream or river.

Although P. subtentum has been recorded for the Tennessee River, Ortmann (1918; 1925) indicates that the species has a decided preference for tributaries and headwaters locations. Morrison (1942) concurs with this, and states that P. subtentum is found in large rivers only in shoal areas. Ptychobranchus subtentum is found most often in relatively shallow water with a strong current, in a gravel or sand substrate (Warren 1975).

Medionidus conradicus is a small mussel, generally less than three inches long in its adult form. This species is found principally in small rivers and their tributaries. Geographically it

is restricted to the Tennessee and Cumberland river systems (Burch 1975) and is considered part of the Cumberlandian mussel fauna (Isom et al. 1973). Most generally M. conradicus is found in a sand/gravel substrate, in shallow water having a strong current (Warren 1975).

During the analysis those Villosa shells too fragmented to identify to species level were categorized as Villosa species. Five species of Villosa have been collected from the Elk River by Ortmann (1925) and Isom et al. (1973), but only four of these, V. taeniata, V. vanuxemensis, V. iris, and V. nebulosa (probably a form of V. iris) were taken from within the Tims Ford Reservoir area. While impossible to prove, a majority of the partial valves are felt by the author to be either V. taeniata or V. vanuxemensis, both of which have been identified from the site. Both of these species are commonly found in small rivers or creeks where they inhabit gravel/sand substrates in shallow water having a strong to moderate current (Warren 1975).

Three of the five most common mussels are Cumberlandian species, only E. dilatata and possibly some of the potential Villosa are exceptions. In all, 10 of the 16 mussel species recovered from 40FR7 are considered by Isom et al. (1973) to be part of the Cumberlandian mussel fauna (see Table 22). As stated by Warren (1975: 112):

> . . . the 'Cumberlandian' fauna as a whole has been more or less restricted in its evolutionary development and subsequent dispersion to clean, shallow high gradient streams and small rivers with silt-free sand and gravel substrates and weakly alkaline, highly oxygenated, hard water, and generally occurs in larger rivers only in riffle or shoal environments.

Based upon these data, it may be assumed with some confidence that those valves recovered from 40FR7 were collected from riffle areas in either the Elk River, 1.4 miles away, or Town Creek, just below the site. Town Creek is a small tributary of the Elk River that may have been able to support mussel populations in at least its lower stretches. No historic collections of mollusks were made from Town Creek prior to its becoming part of the Tims Ford Reservoir.

There were 2,169 identifiable mussel valves recovered from 40FR7. A total of 1,942 valves (89.53% of the total) was from the four units analyzed in the midden area. The 21 features with identifiable mussel shell produced only 9.03% of the total sample, the remaining 1.42% was recovered from 10 postholes. Most of the features which contained mussel shell were within the Central Expansion area. Feature 45, a large pit in the Central Expansion area, contained 40.81% (80 valves) of all the identifiable mussel shell recovered from the features.

Based upon the distribution of the shell, different species seemed to be scattered equally throughout the midden, features, and postholes. There was no recognizable clustering of mussel species at the site. The shells appear to have been gathered at random with very little selection for a particular size or species. Even the smallest species and shells appear to have been collected when encountered. Pegias fabula, which was represented at the site by 21 individuals, is less than two inches long when fully grown; many of the valves from this species were one inch or less in length.

A total of 54,113 freshwater snails was recovered from excavations at 40FR7 (Table 23). These were often mixed with mussel shells in the midden, features, and postholes. Historically 12 species of freshwater snails from seven genera have been collected from the Elk River (Appendix A). Almost all of the recovered shell (54,056 pieces or 99.89% of the total sample) belongs to the family Pleuroceridae. Fifty-seven shells or .10% of the total sample are members of the family Viviparidae. This discrepancy in numbers is believed to have been caused principally by the different habitat preferences of each family. Viviparid snails are most generally found in quiet waters, often in soft mud or sandy substrates and on vegetation (Clench and Turner 1956). Pleurocerid snails, on the other hand, generally require shallow (less than one meter deep), clear water with a good current and a rocky substrate (LaRocque 1968; Goodrich 1934). Pleurocerid snails would have been more easily observable and accessible for Indian collection. It would have been a simple matter to locate them and scrape them off the rocks into baskets. Ease of collection, rather than a taste preference most likely accounts for the predominance of the pleurocerid snails in the samples.

All freshwater snail shell from this site was analyzed. The shells were recovered from three types of cultural disturbances, midden deposits, features, and postholes. A majority of the snail shells (37,852 specimens) were from four 2x2 m test units placed in the midden deposit on the northern periphery of the site. Each of

Table 23

Freshwater Gastropoda from the Owl Hollow Site (40FR7)

Species	Pieces	MNI	Percent Of Total
Freshwater Gastropods			
Lithasia verrucosa form *lima*/*L. geniculata* form *fuliginosa*	32,226	32,226	59.55
Lithasia obovata	13,195	13,195	24.38
Lithasia sp.	2,618	2,618	4.83
Pleurocera canaliculatum	3,763	3,763	6.95
Goniobasis laqueta/*edgariana*	595	595	1.09
Leptoxis subglobosa	1,659	1,659	3.06
Campeloma sp.	6	6	.01
Viviparous georgianus	51	51	.09
Total Ident. Freshwater Gastropods	54,113	54,113	99.96

these units was excavated in 10 cm levels to the base of the midden deposit, generally to 30 cm below the ground surface. Additionally there were 13,272 snail shells in 58 features and 2,989 specimens in 124 postholes at 40FR7.

The most numerous species of freshwater snails found at 40FR7 (32,226 specimens or 59.55% of the total collection) consisted of two taxa, Lithasia verrucosa form lima and L. geniculata form fuliginosa. The two forms are so similar in shell morphology that for archeological materials it was felt safest to group them together. Each has a conic or subfusiform shell with a large elliptic aperture, and varying numbers of nodules (Tryon 1873). Each species would appear to have similar habitat requirements. Specimens of L. geniculata form fuliginosa have been collected by the author from rocks in shallow riffle areas of the upper Duck River, and Tryon (1873) notes that Conrad found L. verrucosa form lima specimens adhering to stones in the Elk River.

Lithasia obovata cf. form sordida, totaling 13,195 specimens, was the second most numerous species of freshwater snail found at 40FR7. The sordida form of L. obovata is said by Goodrich (1940) to have been collected historically from the Elk River, but in another article (Goodrich 1934) he cautions that each colony of L. obovata is likely to be made up of two or three different obovata forms. The majority of the L. obovata specimens recovered from 40FR7 resemble the sordida form and have been tentatively identified as such. No precise data could be located on the ecological requirements of this

species, but it is presumed that they lived in habitats similar to those of L. verrucosa form lima/L. geniculata form fuliginosa.

Undiagnostic immature or badly broken Lithasia specimens were classified as Lithasia sp. There were 2,618 shells in this category. Lithasia as a group made up a majority of the identifiable freshwater snails at 40FR7, 49,039 pieces or 88.76% of the entire sample.

There were 3,763 specimens of Pleurocera canaliculatum recovered from excavations at 40FR7, making it the third most numerous freshwater snail at the site. Goodrich (1935) notes that the excuratum form of P. canaliculatum has been collected from the Elk River. While many of the archeological specimens resemble the excuratum form, an equally large number look like the very similar undulatum form of P. canaliculatum. Since their ecological requirements are thought to be very similar and because of the difficulty in identifying archeological specimens, no attempt was made to differentiate these two forms.

As stated earlier in the 40BD55 discussions, P. canaliculatum is said by Goodrich (1938) and Morris (1939) to inhabit muddy situations. The author has, however, collected this species from a clean gravel bar in relatively shallow, swiftly moving water in the Duck River.

There were 1,659 specimens of Leptoxis subglobosa in the 40FR7 freshwater snail material. Leptoxis subglobosa and L. praerosa have both been collected from the Elk River. They are closely related, with subglobosa considered to be a headwaters form which is replaced

downstream by praerosa. Based upon their morphology (smaller size and higher spires) and upriver location, the 40FR7 Leptoxis are believed to be L. subglobosa. Goodrich (1934a) believes that the genus Leptoxis occurs mainly in fast water and disappears where streams wear down to grade. Leptoxis subglobosa is found primarily in smaller rivers and creeks.

There were 595 specimens of Goniobasis laqueta/edgariana recovered from the excavations at 40FR7. Goniobasis laqueta and G. edgariana are each recorded as having been collected from the Elk River (Goodrich 1940). Both species are extremely similar in appearance and the author was unable to differentiate the archeological specimens using the collection species available. It was thought most practical to classify them together. As noted in the 40BD55 freshwater snail accounts, G. edgariana is quite ubiquitous in the types of habitats in which it is found. Although specific information is lacking, G. laqueta is presumed to also be generalized in its habitat preferences.

Fifty-one specimens of Viviparous georgianus were identified during the analysis of the freshwater snails. The Indians probably utilized only small numbers of V. georgianus because of the difficulty in locating and collecting it. Viviparous georgianus is not generally found in the main river channels, but in the sloughs that border them or in smaller creeks, lakes, ponds, and springs.

Campeloma, with only six specimens, was the least common freshwater snail found at 40FR7. Because of the current confusion

surrounding the taxonomy of the genus, a more detailed identification was not attempted for this study. Bickel (1968), however, notes that four species of Campeloma have been recorded for Tennessee, C. decisum, C. crassula, C. geniculum, and C. exile. The six specimens in the collections resemble each other quite closely and could belong to one of these four species. Almost all Campeloma are found in sand-silt substrata in lakes or streams with slowly moving water. In these areas the Campeloma burrow into the river substrate or the dead plant materials gathered there.

Based upon the species recovered, the author believes that the Owl Hollow peoples at 40FR7 were probably gathering the majority of their freshwater snails from the Elk River or the lower portion of Town Creek. The vast majority of the specimens in the samples are pleurocerid species which require water with a steady rather swift current, and generally a gravel substrate. The Owl Hollow site is at the upper reaches of Town Creek and the stream may have flowed only intermittently there during periods of low rainfall. Freshwater snails and mussels were probably collected from the same areas simultaneously.

Since Cobb and Faulkner (1978) theorized that habitation loci at 40FR7 had alternated between winter houses on the outer portion of the site and summer structures near its center, special attention was paid to the distribution of freshwater snails across the site. Freshwater gastropods and other aquatic fauna were believed by Cobb and Faulkner (1978) to have been exploited primarily during the warm

months of the year. Distribution of the snails proved to be rather localized, with the vast majority being found in the midden area and the contiguous Central Expansion area. As stated previously, 37,852 freshwater snail shells were found in the four midden excavation units which were analyzed. Thousands more were present in the unsampled units. In the Central Expansion area, 8,722 shells were found in 30 features. A majority of the postholes containing shells were also situated in the Central Expansion area. In the Western Expansion area, 1,829 shells were found in 11 features, while a total of 1,516 shells was found in four features in the Eastern Expansion area. Features outside of the major excavation areas produced a total of 1,206 shells.

Freshwater snail and bivalve shells are believed to have been placed in the midden and features after the removal of the soft parts. In the Central Expansion area, Feature 45, which has been categorized as a storage/refuse pit, contained 6,753 snail shells and 80 mussel valves. This represents 77% of all freshwater snail shells found in the Central Expansion area. Excluding the midden no other feature at the site contains such a large number of shells. Since no stratigraphy or evidence of wall slumping was noted in this feature, it is quite probable that this faunal assemblage may represent a single dumping episode, possibly the residue from a single large meal, with freshwater snails being one of the main courses.

Only five other features at the site contained over 500 freshwater snails. These include Feature 149 in the Central

Expansion area (585 specimens), Feature 73 in the Eastern Expansion area (1,179 specimens), Features 11 and 20 in the Western Expansion area (688 and 711 specimens respectively), and Feature 109 which was located between the Western and Central Expansion areas (592 specimens). The vast majority of the features possessing freshwater snail shells contained less than 100 specimens each. No single type of feature seems to have been used for shell disposal; of the six features containing more than 500 shells, three were categorized as storage/refuse features (Features 45, 20, and 109), Feature 73 was an earth oven, Feature 149 was a shallow smudge pit, and Feature 11 was a shallow basin.

Horizontal placement of freshwater snail shells across 40FR7 is not thought to give any real indication of the season in which an area of the site was inhabited. The midden was a general dump area and refuse was most probably thrown there throughout the year, over a period of several years. If Feature 45 in the Central Expansion area functioned as a storage/refuse pit as conjectured, it would have been emptied of its food stores during the winter or early spring months. The shell and other refuse found in it would have been deposited shortly after the stores were removed since the feature did not display any wall slumping as would have occurred if it had been left open for any period of time. Feature 45 then was most likely constructed in the autumn to store food, emptied in the winter or early spring, and refilled with refuse in the late winter or early spring. Based upon this conjecture, freshwater gastropods and

pelecypods would have been collected during the winter or early spring and cannot reliably be used as warm weather indicators. Or, if in fact the mollusks were collected and thrown into the open features during the summer, many of the pits which were thought to be storage facilities may have served another function.

At 40FR7 terrestrial snails were analyzed from two of the 2x2 m midden units (98N48E and 98N52E). In each unit the midden was approximately 30 cm deep and was excavated in 10 cm levels. The majority of the terrestrial snails were recovered from the fine screen portion of the water screened materials. All terrestrial gastropods were separated from the aquatic gastropods during the laboratory rough sorting procedures. The thousands of extremely small snails which were recovered dictated that a subsampling scheme would be in order.

First, a 4 mm mesh geological screen was used to sort the terrestrial snail sample of each unit level into large and small fractions. The entire large fraction from each level was completely analyzed since only a few of the terrestrial snails were larger than 4 mm. A riffle sorter was then used to divide the small fraction of each unit level into eight equal parts. One eighth of the small fraction from each unit was analyzed. Table 24 displays the numbers of each terrestrial snail species actually analyzed from each unit level. Those species for which only one eighth of the total sample was analyzed have been designated by an asterisk. All of these species are less than 4 mm in diameter. Table 25 has been corrected

Table 24

40FR7 Terrestrial Gastropods, Specimens Actually Analyzed

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total	Overall Total
Pupoides albilabris*	-	-	-	-	2	-	1	3	3
Gastrocopta armifera*	61	71	40	172	83	63	35	181	353
Gastrocopta contracta*	52	35	19	106	70	10	14	94	200
Gastrocopta sp. (immatures)*	41	43	34	118	46	16	23	85	203
Anguispira alternata	5	4	5	14	-	-	-	-	14
Discus patulus	721	662	557	1,940	1,041	868	341	2,250	4,190
Helicodiscus notius*	36	56	32	124	9	24	11	44	168
Clappiella sp.*	11	10	9	30	2	7	6	15	45
Mesomphix vulgatus group	2	-	-	2	-	-	-	-	2
Mesomphix cupreus or friabilis	-	2	-	2	-	-	-	-	2
Mesomphix sp. (immature)	-	-	-	-	-	-	1	1	1
Retinella sculptilis	1	-	-	1	-	-	-	-	1
Retinella cf. carolinensis, indentata, praecox group	-	10	1	11	1	-	-	1	12
Retinella lewisiana*	7	8	1	16	-	-	-	-	16
Retinella sp. (immatures)*	78	97	44	219	95	37	40	172	391
Euconulus dentatus*	1	-	-	1	3	-	-	3	4
Hawaiia minuscula*	207	220	157	584	200	138	76	414	998
Zonitoides arboreus*	191	299	200	690	410	336	199	945	1,635
Stenotrema leai aliciae	-	1	-	1	-	1	-	1	2
Stenotrema stenotrema	24	16	8	48	8	21	7	36	84
Mesodon inflectus	22	30	14	66	11	16	11	38	104
Mesodon downieanus or clausus	6	9	2	17	24	12	1	37	54
Mesodon thyroides	-	2	2	4	1	-	-	1	5

Table 24 (continued)

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total	Overall Total
Triodopsis albolabris	-	-	-	-	-	1	-	1	1
Polygyridae (immatures)	84	57	47	188	43	38	19	100	288
Totals	1,550	1,632	1,172	4,354	2,049	1,588	785	4,422	8,776

* Species smaller than 4 mm, 1/8 of each unit level was analyzed for these species. All other species are larger than 4 mm; all of these specimens were analyzed.

Table 25

40FR7 Terrestrial Gastropods, Estimated Specimens

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total	Overall Total
Pupoides albilabris*	-	-	-	-	16	-	8	24	24
Gastrocopta armifera*	488	568	320	1,376	664	504	280	1,448	2,824
Gastrocopta contracta*	416	280	152	848	560	80	112	752	1,600
Gastrocopta sp. (immatures)*	328	344	272	944	368	128	184	680	1,624
Anguispira alternata	5	4	5	14	-	-	-	-	14
Discus patulus	721	662	557	1,940	1,041	868	341	2,250	4,190
Helicodiscus notius*	288	448	256	992	72	192	88	352	1,344
Clappiella sp.*	88	80	72	240	16	56	48	120	360
Mesomphix vulgatus group	2	-	-	2	-	-	-	-	2
Mesomphix cupreus or friabilis	-	2	-	2	-	-	-	-	2
Mesomphix sp. (immature)	-	-	-	-	-	-	1	1	1
Retinella sculptilis	1	-	-	1	-	-	-	-	1
Retinella cf. carolinensis, indentata, praecox group	-	10	1	11	1	-	-	1	12
Retinella lewisiana*	56	64	8	128	-	-	-	-	128
Retinella sp. (immatures)*	624	776	352	1,752	760	296	320	1,376	3,128
Euconulus dentatus*	8	-	-	8	24	-	-	24	32
Hawaiia minuscula*	1,656	1,760	1,256	4,672	1,600	1,104	608	3,312	7,984
Zonitoides arboreus*	1,528	2,392	1,600	5,520	3,280	2,688	1,592	7,560	13,080
Stenotrema leai aliciae	-	1	-	1	1	-	-	1	2
Stenotrema stenotrema	24	16	8	48	8	21	7	36	84
Mesodon inflectus	22	30	14	66	11	16	11	38	104
Mesodon downieanus or clausus	6	9	2	17	24	12	1	37	54
Mesodon thyroides	-	2	2	4	1	-	-	1	5

Table 25 (continued)

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total	Overall Total
Triodopsis albolabris	-	-	-	-	-	1	-	1	1
Polygyridae (immatures)	84	57	47	188	43	38	19	100	288
Totals	6,345	7,505	4,924	18,774	8,490	6,004	3,620	18,114	36,888

* Species smaller than 4 mm, 1/8 of each unit level was analyzed for these species. All other species are larger than 4 mm; all of these specimens were analyzed.

for the sampling procedures; each of the sampled species has been multiplied by eight to estimate the numbers which would have been present if the entire sample had been analyzed. Table 26 presents the percentages for the estimated specimens.

It was hoped that the analysis of the terrestrial gastropods from the midden samples at 40FR7 would provide two types of information: (1) environmental data on the immediate site locale, and (2) information about the stability of site conditions through time. As will be seen, the first of these goals was only partially successful and the second failed completely.

There were at a minimum 21 species of terrestrial snails identified from the two midden samples at 40FR7. Four groups of immature shells could be identified only to the generic or family levels. Most of the species at 40FR7 are represented by only a very small number of shell specimens; 17 of the species or groups of immatures each make up less than 1% of the total estimated sample. The remaining eight species or groups of immatures make up 96.98% of the estimated total from the two units. Hawaiia minuscula and Zonitoides arboreus account for 57.10% of the total estimated sample.

Research found that those snail species which were most numerous in the samples also had the greatest habitat breadth. Species estimated to have over 1,000 specimens in the sample include in order of their abundance the following: Zonitoides arboreus, Hawaiia minuscula, Discus patulus, Gastrocopta armifera, G. contracta, and Helicodiscus notius. Groups of immatures were not included since it

Table 26

40FR7 Terrestrial Gastropods, Percentages of Estimated Specimens

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total
Pupoides albilabris*	-	-	-	-	0.08	-	0.04	0.12
Gastrocopta armifera*	2.59	3.02	1.70	7.31	3.66	2.78	1.54	7.98
Gastrocopta contracta*	2.21	1.49	0.80	4.50	3.09	0.44	0.61	4.14
Gastrocopta sp. (immatures)*	1.74	1.83	1.44	5.01	2.03	0.70	1.01	3.74
Anguispira alternata	0.02	0.02	0.02	0.06	-	-	-	-
Discus patulus	3.84	3.52	2.96	10.32	5.74	4.76	1.88	12.38
Helicodiscus notius*	1.53	2.38	1.36	5.27	0.39	1.05	0.48	1.92
Clappiella sp.*	0.46	0.42	0.38	1.26	0.08	0.30	0.26	0.64
Mesomphix vulgatus group	0.01	-	-	0.01	-	-	-	-
Mesomphix cupreus or friabilis	-	0.01	-	0.01	-	-	-	-
Mesomphix sp. (immature)	-	-	-	-	-	-	+	+
Retinella sculptilis	+	-	-	+	-	-	-	-
Retinella carolinensis, indentata, praecox group	-	0.05	+	0.05	+	-	-	+
Retinella lewisiana*	0.29	0.34	0.04	0.67	-	-	-	-
Retinella sp. (immatures)	3.32	4.13	1.87	9.32	4.19	1.63	1.76	7.58
Euconulus dentatus*	0.04	-	-	0.04	0.13	-	-	0.13
Hawaiia minuscula*	8.82	9.37	6.69	24.88	8.83	6.09	3.35	18.27
Zonitoides arboreus*	8.13	12.74	8.52	29.39	18.10	14.83	8.78	41.71
Stenotrema leai aliciae	-	+	-	+	+	-	-	+
Stenotrema stenotrema	0.12	0.08	0.04	0.24	0.04	0.11	0.03	0.18
Mesodon inflectus	0.11	0.15	0.07	0.33	0.06	0.08	0.06	0.20
Mesodon downieanus or clausus	0.03	0.04	0.01	0.08	0.13	0.06	+	0.19
Mesodon thyroides	-	0.01	0.01	0.02	+	-	-	+

Table 26 (continued)

Species	98N48E 0-10cm	10-20cm	20-30cm	Unit Total	98N52E 0-10cm	10-20cm	20-30cm	Unit Total
Triodopsis albolabris	-	-	-	-	-	+	-	+
Polygyridae (immatures)	0.44	0.30	0.25	0.99	0.23	0.20	0.10	0.53
Totals	33.70	39.90	26.16	99.76	46.78	33.03	19.90	99.71

* Species smaller than 4 mm, 1/8 of each unit level was analyzed for these species. All other species are larger than 4 mm; all of these specimens were analyzed.

+ Less than 0.01% of unit total.

is not possible to discuss habitat requirements for unknown species. Only a very general reconstruction of environmental conditions in the site area is possible based upon the species present. Although they are not sensitive indicators of a specific habitat, most of the species found at 40FR7 generally occur in the moist leaf litter of deciduous forests (Archer 1939; Baker 1930; Bickel 1968; Burch 1956, 1962; Coney 1980; Grimm 1959; Hubricht 1952, 1962; Lutz 1950; Morrison 1942; Pilbry 1940, 1946, 1948; and Richards 1934). They were probably drawn to the midden from the forest surrounding the site by an abundant food supply (fungi mycelia on rotting plant and animal material) and by the calcium carbonate in the numerous discarded aquatic gastropod and pelecypod shells.

The terrestrial snail samples from the midden units were also examined for evidence of changes in species composition or frequency through time. Consistent changes in species composition from top to bottom in the midden would have been indicative of humanly induced changes in the local environment (i.e. clearing of land for settlement and possibly agriculture). Examination of the species present in each of the three arbitrary 10 cm levels of the two analyzed units found no consistent changes in the species present or their frequencies in the excavation levels. In retrospect, the midden appears to have been laid down over a rather short period of time. No stratigraphy was noted in the midden and there was no evidence of consistent change in the species composition of the terrestrial snails present in the deposit nor in their frequency of occurrence.

As at the other Owl Hollow sites, mammals were the most important source of meat to the occupants of 40FR7. Mammals made up 73.36% of the total bone found at the site and 94.04% of the usable meat. Of the 17 species of mammals considered by the author to have been food resources, the white-tailed deer would have been the most significant. There was a minimum of nine white-tailed deer present in the faunal sample. Other mammal species identified from the faunal collection would have contributed lesser quantities of meat to the diet.

Amphibians were probably the least important animal group to the diet of the 40FR7 occupants. Only the hellbenders and frogs are considered to have been utilized and they would have yielded only minimal amounts of meat per individual.

Birds, reptiles, and fish, however, would have been important supplemental meat resources. Of the birds, only the turkey seems to have been taken with any regularity; six individuals were represented in the sample. Other avian species are only tokenly represented and would have added little to the diet.

Turtles and snakes appear to have been utilized frequently, as were fish. The importance of fish to the diet may, in fact, be underemphasized since it was not possible to calculate the estimated amount of meat that would have been available from those specimens present at the site. To do so would have required a comparative collection of fish skeletons of different sizes for each species, where the live weight of each specimen was known. Or failing this

the researcher would have needed a regression table for known skeletal elements from each species that would predict the live weight of the fish. Neither of these was available at the time of the analysis. The importance of fish to the diet is instead suggested by the number of species present in the sample (14), the total minimum number of individuals calculated (98), and the total number of fish bones found at the site (23,723).

The remains of freshwater mussels and snails were abundant at the site; these animals were probably sought out as dietary supplements. Although the amount of meat which can be gained from each of these invertebrates is small, they are easily located and may have served as a reliable meat resource when nothing else could be found. Terrestrial snails probably contributed nothing to the Indian diet; their presence shows only that the site was surrounded by a moist deciduous forest.

The faunal resources utilized by the inhabitants of 40FR7 were probably taken on a seasonal basis as they became most available or desirable. The hypothesized seasonality of Owl Hollow faunal utilization will be discussed in detail in the summary chapter.

As at 40BD55, the fauna exploited at 40FR7 was taken from a wide range of habitats surrounding the site. The Owl Hollow peoples were obviously intimately familiar with their environment and what it had to offer. Aquatic resources included freshwater mussels and snails, fish, the otter, beaver, and muskrat, ducks, geese, and sandhill crane, turtles, hellbenders, and frogs. The woodchuck would have

been most common in open meadow areas, while the opossum, striped skunk, gray fox, porcupine, cottontail, white-tailed deer, ruffed grouse, bobwhite, turkey, mourning dove, common crow, and box turtle would have prefered an open forest edge habitat. The raccoon, mink, and gray squirrel all generally inhabit heavily wooded areas near streams.

A number of the animal species found at 40FR7 may be used as seasonal indicators of site occupation. The woodchuck is one of the better mammal indicators. Woodchucks are true hibernators; generally they enter their dens by the end of October and do not emerge until after February when the weather warms sufficiently to bring about new vegetation growth (Schwartz and Schwartz 1959). The woodchuck at 40FR7 would have been taken during the warmer weather months, between March and October.

Two white-tailed deer frontal bone fragments, each with an antler pedicel, were found at 40FR7. In each case the antler had been shed. Deer generally shed their antlers between the last of December and mid-February; growth of the antler is initiated again in April or May. The base of a shed antler was also found at the site. Shed antlers must be picked up quickly after they fall off or rodents will gnaw them for their mineral content; this antler base was probably retrieved during the winter months.

The mandibles of immature white-tailed deer (those less than two years old) can be used as seasonal indicators since deciduous teeth are replaced at known chronological rates and the birthing months for

fawns are generally recorded (Severinghouse 1949). At 40FR7 no complete mandibles were found for immature white-tailed deer. Isolated deciduous teeth were noted in the collections, however, proving that immatures were taken. The four ageable mandibles in the faunal sample were all from adults. Based upon tooth wear, two were from separate animals each approximately 3 1/2 years old and two, a right and a left, were from the same animal that was approximately 4 1/2 years old at the time of its death.

If the sandhill crane element is from a migratory bird, it may have been taken during the northward spring migration from late February through May or the return fall migration which begins with the onset of cold weather in October (Terres 1980). The passenger pigeon may also be considered a seasonal indicator. Records show that the passenger pigeon generally began its northward spring migration in March and its southward autumn migration in September (Bent 1932). The passenger pigeon would have been available for exploitation in Tennessee during at least these months. Bird eggs could have been collected in the spring and early summer.

Among the reptiles recovered from the site the box turtle and the snakes are the best seasonal indicators. Box turtles and snakes would have been active only during the warmer months of the year, late spring through early autumn. These animals would have sought refuge in burrows during the winter. The aquatic turtle species would have been active for a much longer period of time in the early winter since their water habitat takes longer to cool.

The hellbender and frogs utilized by the Owl Hollow peoples would also have been available only during the warm weather months of the year. Both animals burrow into the stream mud and hibernate after the onset of cold weather in the autumn.

Additional seasonal indicators of site occupation include structural and paleobotanical remains. Structural remains were found in the Central and Eastern Expansion areas. In the Central area there were found numerous postholes from a lightly built, often reconstructed, circular to oval, warm weather house. The structure is believed to have been approximately 20 feet in diameter. The paired earth ovens and four support posts found in the Eastern Expansion area suggested the presence of a winter house. The outer walls of this structure were poorly defined and its exact size is unknown.

Cobb and Faulkner (1978) attribute a spring-summer occupation to the structure in the Central Expansion area because of its light construction, lack of interior surface hearths or earth ovens, and the presence of abundant aquatic fauna. The fish and aquatic mollusks found in this area are believed to have been exploited primarily during the warm months of the year. Conversely, the structure in the Eastern Expansion area is believed to be a winter house because of the earth ovens and heavy support posts, the presence of storage features, and a lack of aquatic (warm weather) faunal species. The author believes that Cobb and Faulkner are most likely correct in their attribution of seasonal occupation to these

structures, but not necessarily because of the presence or absence of aquatic fauna. Cobb and Faulkner (1978) based many of their initial assumptions on preliminary faunal analyses, but more complete analyses appear to paint a different picture.

The Central Expansion area most certainly possesses a greater number of aquatic mollusks than were found in the Eastern Expansion area. There were 8,722 identifiable aquatic gastropods and 125 pelecypods in the Central Expansion area versus 1,516 aquatic gastropods and 23 pelecypods in the Eastern Expansion area. It is questionable, however, whether these mollusks can be trusted as seasonal indicators. As was discussed earlier, the vast majority of the mollusks from the Central Expansion area came from Feature 45, which has been defined as a storage/refuse feature. If this is true the refuse was probably placed there in the late winter or early spring while the weather was cold or quite cool.

In examining the vertebrate fauna found at 40FR7 the author noted a number of species that may be considered exclusively or nearly exclusively aquatic. These species include: all fish (14 species), the otter, beaver, muskrat, Canada goose, duck sp., sandhill crane, snapping turtle, stinkpot, mud turtle, Graptemys/ Chrysemys spp., softshell turtle, hellbender, and the ranid frogs. The distribution of these species and the other vertebrates in the excavation areas across the site can be seen in Tables 20 and 21 (pages 148 and 157). A total of 146 identifiable skeletal elements from 18 species of aquatic animals was found in the Central Expansion

area, along with an additional 2,322 indeterminate fish bone pieces. Aquatic animal remains in the Eastern Expansion area were nearly as abundant as in the Central Expansion area. There were 117 skeletal remains from 14 species of aquatic animals found in the Eastern Expansion area, with an additional 1,852 indeterminate fish remains. There is not a significant enough difference in the numbers or types of vertebrate aquatic animal remains found in these two areas to use the fauna to postulate a difference in their seasonal occupation.

Plant remains were numerous at the site and include, in part, seeds from goosefoot, pigweed, knotweed, maygrass, and grapes. Hickory and walnut shell fragments were also recovered, as were the remains of sunflowers and squash (Crites 1978a). The sunflower is a North American domesticate, while the origins of squash lie in Mesoamerica. As stated for 40BD55, the nut crops, goosefoot, pigweed, knotweed, sunflower, and squash would have been ready for consumption in the late summer or autumn. All could have been stored for winter consumption. Maygrass ripens in the late spring and early summer, and wild grape vines generally bear their fruit in the summer.

An examination of the faunal seasonal indicators alone would not definitively indicate the seasons in which 40FR7 was occupied. However, when combined with floral and structural evidence at the site, it becomes obvious that 40FR7 was occupied throughout the entire year by at least a part of the inhabitants.

Seventeen skeletal elements bearing skinning or butchering cuts

were found at 40FR7. The vast majority of these elements (14) were from the white-tailed deer, but single elements from a dog, beaver, and raccoon were also recovered. Those white-tailed deer skeletal elements having skinning or butchering cut marks include a frontal bone, two mandibles, a scapula, three humeri, one ulna, one radius, one metacarpal, one femur, two astraguli, and two metatarsals.

A deer right frontal bone from the midden was found to have skinning cuts around the antler pedicel. The cut marks were noted posteriorly and laterally of the base of the antler pedicel and would have been inflicted while removing the hide from the skull.

Additional skinning cuts were found on a metacarpal from Feature 139 in the Eastern Expansion area and on a metatarsal from Feature 49 in the Central Expansion area. The metacarpal consists of a posterior shaft fragment with light cut marks running around the shaft. Cut marks were also found on a left proximal metatarsal. As on the metacarpal, the cut marks were found to run perpendicular to the shaft and would have been made while cutting the hide from the lower leg.

Two deer mandibles, one a left from the midden and the other a right from Feature 150 in the Eastern Expansion area, were found to have butchering cut marks. In each case the cut marks were located across the outer ascending ramus. Butchering cuts in this position would have severed the masseter muscle, thus allowing the jaw to be disarticulated from the skull.

Evidence of how the front leg of a deer was disarticulated was

found on a scapula, three distal humeri fragments, a radius, and an ulna. A left scapula from Feature 150 in the Eastern Expansion area was found to have several butchering cuts on its medial side slightly behind the scapula head. These cut marks would have been made while separating the scapula from the humerus. Since the cuts were on the medial rather than the lateral side of the bone they could have been made only after the entire leg had been removed from the carcass.

Two of the distal humeri fragments with butchering cuts were from the midden and the third was from Feature 139 in the Eastern Expansion area. In all three cases the butchering cuts were found on the face or sides of the articular condyles. This particular joint, where the humerus, radius and ulna articulate, is extremely tight and is difficult to separate without cutting into bone. Additional evidence of this is found on a proximal radius found in Featue 139 of the Eastern Expansion area. Cut marks were found on the anterior shaft of this bone just below the head. An ulna shaft fragment from Feature 150 in the Eastern Expansion area had numerus scrape marks running the length of the shaft. The meaning of these scrape marks is uncertain, but they may have been made while scraping meat from the bone, either before or after cooking.

Evidence for the disarticulation of the rear leg was found on a distal right femur fragment from the midden and two astraguli, one from the midden and the other from Feature 20 in the Western Expansion area. A large number of cut marks were noted on the posterior of the femur on and just above the condyles. These cuts

would have been inflicted while separating the femur from the tibia and fibula. For both astraguli, cut marks were located on the anterior face of the bone. The astragulus is one of the bones forming an extremely tight ankle joint between the tibia and the metatarsal. There is very little meat on the metatarsal and it would have been desirable to remove it from the tibia. As will be seen later, however, the metatarsal was a desirable source of dense, hard bone for tools.

The dog femur displaying butchering cuts was recovered from the midden. As discussed previously, the cut marks on this element were found on the lateral side of the bone just below the neck. These cuts would have been made when separating the femur from the pelvis.

Butchering cuts were also found on a right beaver femur. A number of fine cut marks were noted immediately below the neck of the femur head. Muscles would have been cut at this area to remove the leg from the innominate.

Two small cut marks were present on a right raccoon ulna found in Feature 138 in the Eastern Expansion area. The cut marks were on the lower articulating facet of the semilunar notch and would have been made while separating the lower leg from the humerus.

Six bones at the site were found to have been subjected to dog gnawing. Five of these were from the white-tailed deer (1 distal metapodial, 1 distal humerus, 1 proximal tibia, and 2 calcanea) and one was an indeterminate large mammal bone fragment. Evidence of gnawing consisted of pitting and crushing of the bone surface

consistent with that found to be inflicted on bones by modern dogs. Five of the bones were found in features in the Eastern Expansion area and one was from the midden. The fact that most of these bones were found in features in the Eastern Expansion area suggests that bones from many prey animals were left exposed to external forces for some time before being thrown in open features by the site inhabitants. Dogs were also obviously allowed the run of the camp. It may be assumed that the bones were thrown into the closest unfilled feature after they were dropped by the dogs.

Eighty-seven worked or altered bone elements were recovered from excavations at 40FR7. Seventy-four of these were of mammal bone, 12 of bird bone, and one of turtle shell. Forty elements were excavated from features, 24 from postholes, and 23 from the midden. Only 11 of these skeletal elements could be identified to the species level, eight were from white-tailed deer, three from turkey, and one from the eastern box turtle. Three additional elements may be white-tailed deer, while another two are thought to be turkey.

Bone needles and what may be needle shaft fragments were some of the most common bone artifacts recovered from 40FR7. Three complete needles, six shaft fragments with the eye at least partially present, and 27 possible needle shaft fragments were found at 40FR7. Eleven of the complete or fragmentary needles were taken from the midden, 16 were from features, and 10 were from postholes. All of these artifacts were made from large mammal long bone splinters.

The complete bone needles varied considerably in length, with

the longest measuring 167 mm, the shortest 73 mm, and the third 132 mm (Figure 12). Both the longest and the shortest needles have rather flattened cross-sections, while the intermediate size needle has a more rounded shaft. Needles may have been made in different sizes and shapes dependent upon the types of materials to be sewn together. The eye of the intermediate size needle was made by the "scratch technique", whereas the eyes for the other two complete needles were formed by drilling the bone shafts from opposing sides. All three needles have extremely polished surfaces.

Six needle shaft fragments with their eyes wholly, or at least partially present, were found at 40FR7 (Figure 12). Five of the six have flattened cross-sections, the sixth has a more rounded shaft. Each fragment has a highly polished surface. The eyes for five of the needles were made by drilling the bone shafts from opposite sides; only one of the needles had its eye formed by using the "scratch technique". Each of the six needles is missing its distal end.

Twenty-seven possible needle shaft fragments were recovered from 40FR7. These consist of 12 mid-shaft fragments and 16 distal point fragments. Although none of these artifacts have an eye, they have been classified as needles because they are approximately the same size as, and constructed in a manner similar to known needles from the site. Each was made from a large mammal long bone splinter, carefully ground to form a smooth shaft, most often with a nearly circular cross-section. Distal end fragments generally have very

Figure 12. 40FR7. Bone needles and needle fragments.

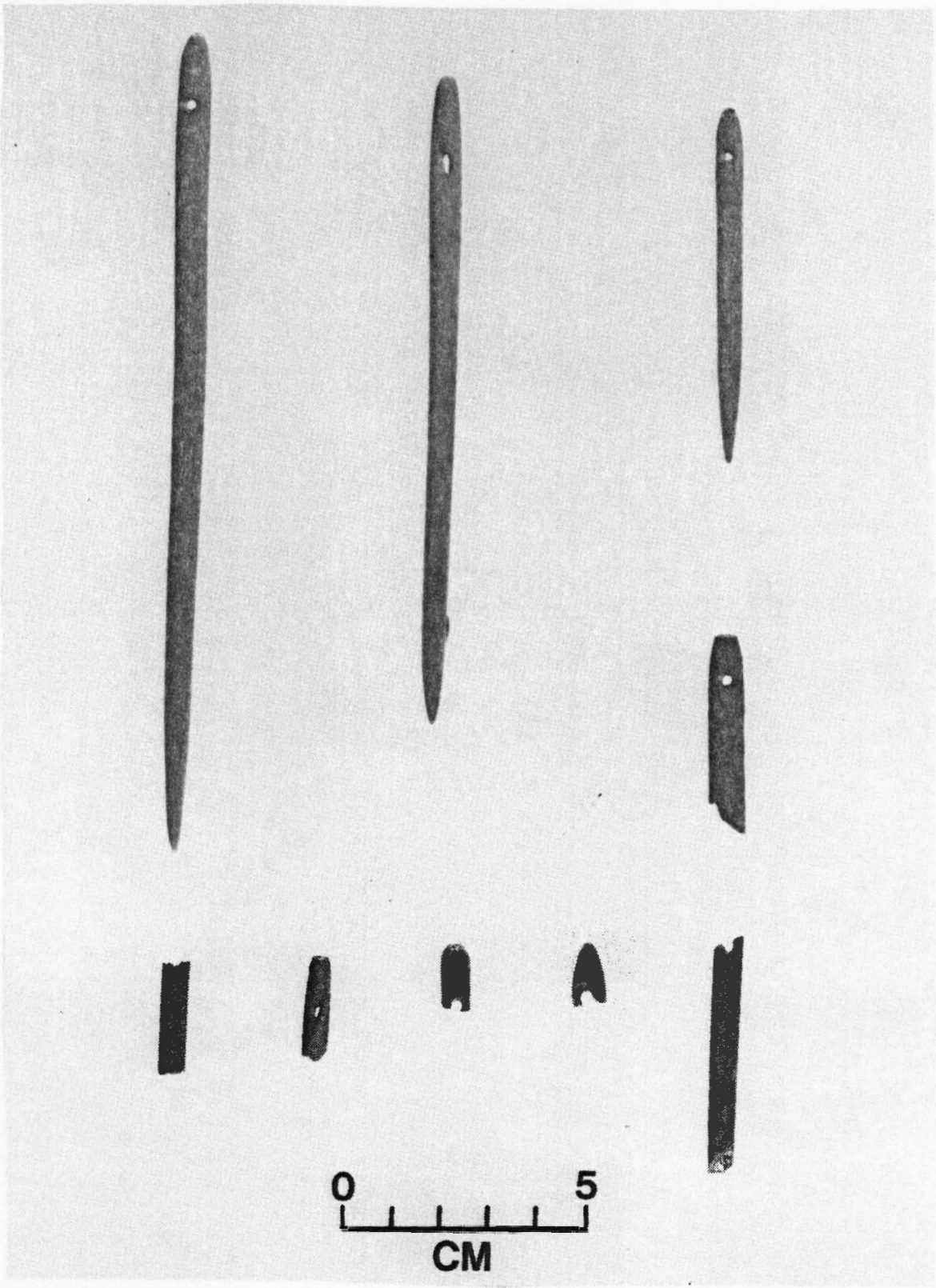

Figure 12.

acute points. The outer surface of each fragment has been highly polished; whether the needles were polished during their initial construction or from subsequent use is unknown. The largest of the needle fragments is 45 mm long while the smallest, a distal point, is 5 mm in length. Their average width is 4.7 mm.

Bone awls were a common artifact found at the Owl Hollow site. Based upon the bone elements and the methods used in their construction, the awls from this site may be organized into four major groupings: deer ulna awls, turkey tarsometatarsus awls, simple bone splinter awls, and refined bone splinter awls. Two complete and three fragmentary deer ulna awls were recovered from 40FR7 (Figure 13a and b). Only the distal ends of the complete ulna awls were altered, this was done by grinding and sharpening the narrow shaft to a fine point. All three fragmentary awls consisted of ground and sharpened distal ulna shaft fragments. It is generally assumed that these ulna awls were used for punching holes while working leather.

Five tarsometatarsus awls were found at the site. Three of these were complete enough to be identified as turkey tarsometatarsi (Figure 13c, d and e); the other two most closely resembled turkey tarsometatarsi, but an exact identification was impossible since their proximal ends were broken away and the distal ends were altered. All five of the awls had the distal trochlea removed and the shafts sharpened. Three of the awls have very flat, extensively worked distal ends, suggesting that they were ground by holding the long axes of the shafts nearly parallel to the abraiding stone. The

Figure 13. 40FR7. A-B. White-tailed deer ulna awls. C-E. Turkey tarsometatarsus awls.

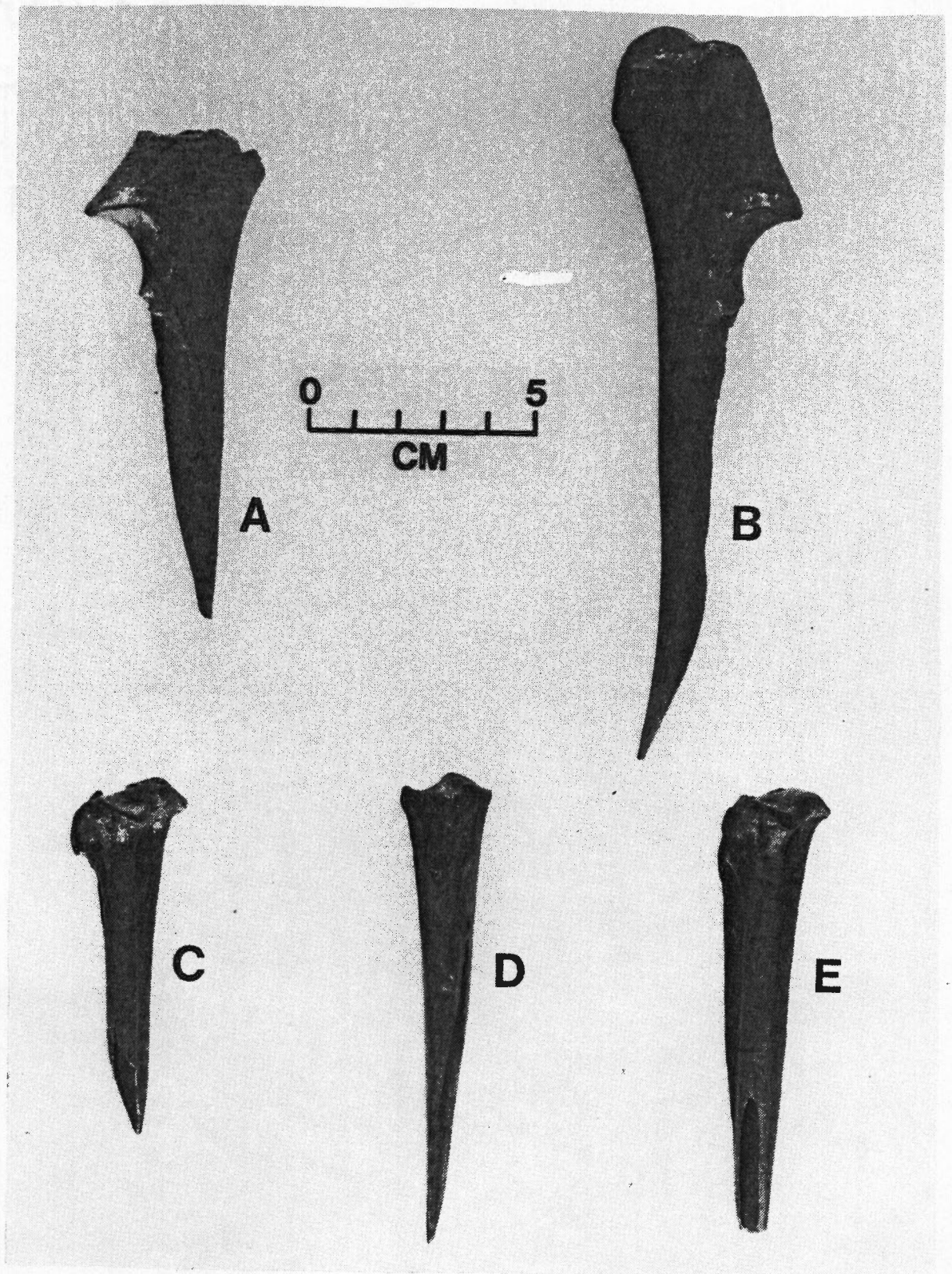

Figure 13.

other two awls have only very small portions of their distal ends ground to a point. Polish on each of the pieces is restricted to the distal sharpened point.

Two additional worked bird bone fragments may have been distal points from tarsometatarsus awls, but they were too small to be definitely identified as such. Each has a flattened cross-section and has been ground to a point. The artifact from Feature 73 measures 20 mm in length and is 9 mm wide, while the piece from Posthole 142 is 28 mm long and 7 mm wide.

Bone splinter awls have been divided into two categories based upon the type and amount of work put into their manufacture: simple bone splinter awls and refined bone splinter awls. Simple bone splinter awls were made from mammal (Figure 14e and f) and bird (Figure 14g and h) long bone splinters. Each awl has only one end ground to a point, the remainder of the bone splinter is unaltered. Polish is restricted to the worked ends and probably resulted from tool use. Two of these tools were made from mammal bone while four were fashioned from bird bone. The mammal bone splinters were from a large deer-size animal and the bird bone splinters came from a large turkey-size bird.

A considerable amount of work was involved in the construction of refined bone splinter awls. For these tools the entire bone shaft, rather than just the utilized tip, was ground smooth and made symmetrical. Four of the more complete examples had their proximal ends squared off and blunted, possibly to facilitate pushing the tool

Figure 14. 40FR7. A-D. Refined mammal bone splinter awls. E-F. Simple mammal bone splinter awls. G-H. Simple bird bone splinter awls.

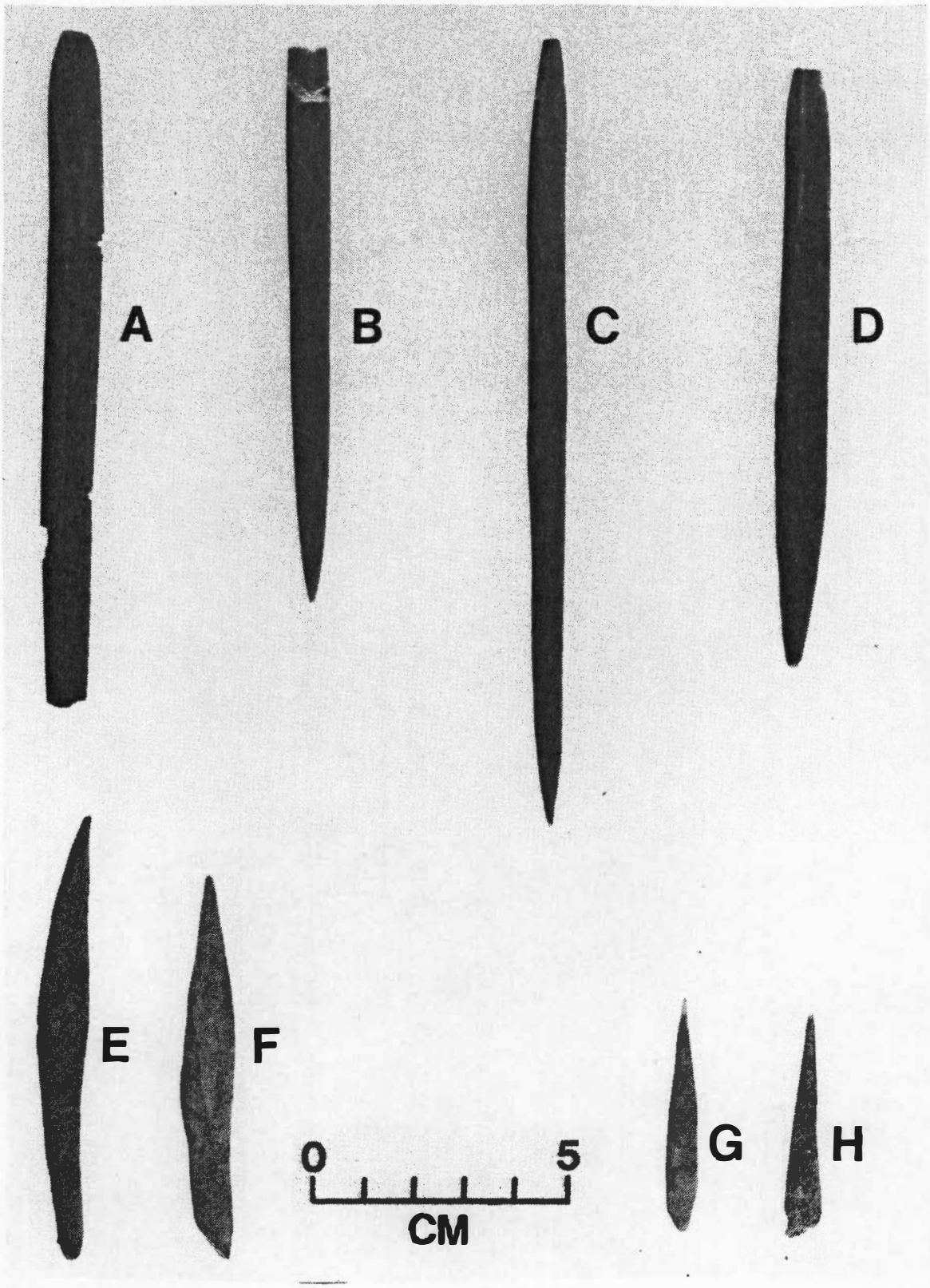

Figure 14.

with the palm of the hand to perforate leather (Figure 14a, b, c and d). All eleven of the refined bone splinter awls were made from large mammal long bone splinters. Ten of these were complete or nearly complete awls and one was a distal point fragment. The refined bone splinter awls from 40FR7 closely resemble the double pointed awls recovered from the Hamilton, Hiwassee Island, and Dallas components at Hiwassee Island (Lewis and Kneberg 1976) and the double tapered awls found at the Westmoreland-Barber and Pittman-Alder sites in the Nickajack Reservoir (Faulkner and Graham 1965). Faulkner (1968) suggests that similar bone artifacts at the Mason site (40FR8) may have been used as projectile points. These tools could also have been used in weaving baskets or even cloth.

Two white-tailed deer metatarsal shaft fragments, one from Posthole 422 and the other from the midden (Figure 15a), shed considerable light on the process by which splinters were obtained from large mammal long bones. Each metatarsal was split into a dorsal and plantar half, with the dorsal half being retained for work. The vascular groove in each specimen was greatly deepened by running a sharp instrument back and forth in the groove. Although no further alteration to these specimens was noted, if the vascular groove in each had been completely or nearly completely cut through, the dorsal half could have been easily split in two. Each of the halves could then have been shaped into needles, awls, or other bone tools.

Two possible skinning or fleshing implements were recovered from

Figure 15. 40FR7. A. White-tailed deer metatarsal with deeply cut groove. B. Indeterminate mammal bone "wedge." C. "Wedge" made from white-tailed deer tibia fragment. D. White-tailed deer antler pestle. E. White-tailed deer antler handle.

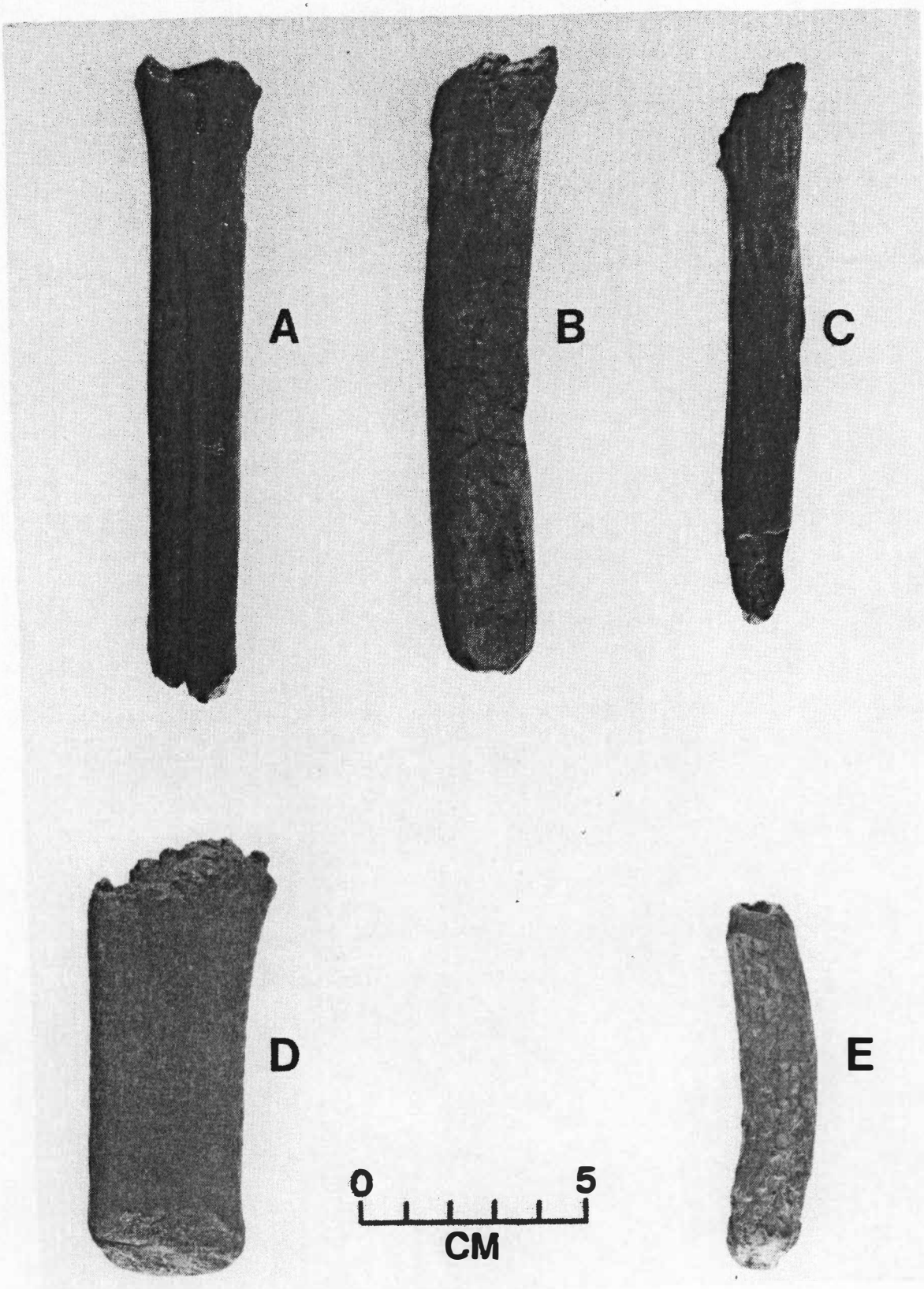

Figure 15.

40FR7, one from the midden and the other from Feature 72. Each was made from a roughly broken large mammal long bone shaft. It was impossible to give the species origin of the bone tool from the midden (Figure 15c), but the piece from Feature 72 was manufactured from a white-tailed deer tibia shaft (Figure 15b). Alteration to these bones was restricted to their distal ends, which were rounded and blunted. Only the edges of these worked areas display any polish. After an animal was killed and the initial skinning cuts were made, these tools could have been used as wedges to help separate the animal's hide from the underlying muscle. The blunt and rounded ends of these tools would not have been as likely to tear the hide as would a stone knife.

Four worked pieces of antler were found at 40FR7. Two of these were most probably from a white-tailed deer, while the other two were too fragmentary to identify more specifically. A basal section of antler beam from a white-tailed deer was recovered from Feature 109 (Figure 15d). The burr area at the proximal end of the beam was ground smooth, as was a portion of the shaft. A majority of the heavy wear, however, was restricted to the base of the beam, and may have been caused by the beam being used as a pestle.

A possible tool handle was fashioned from a section of white-tailed deer antler recovered from Feature 139 (Figure 15e). Based upon its size, this handle appears to have been cut from the beam of a spike buck antler. Both ends of the piece were roughly chopped by a sharp stone tool. The light wear and polish on the

surface of the piece were most probably the result of repeated handling. One end of the antler beam was narrowly hollowed out to permit the socketing of another tool part. The socketed element of this compound tool was not found in association with the antler handle.

The worked antler section recovered from Feature 10 was too fragmentary to determine whether it was from a white-tailed deer or an elk. A majority of the antler was cut and scraped away, leaving only a flat section of its outer face intact (Figure 16a). Bogan (1976) found a similar cut and hollowed antler section with the Cherokee material from the Chota site. Swanton (1946) notes that the historic Santee and Chickasaw Indians reduced the weight of their deer head decoys by cutting away the rear half of the antlers. It is possible that this worked section of antler was at one time part of such a deer head decoy. A number of small pits present on the outer surface of the piece suggest that it may have been dog gnawed.

The only piece of worked antler to be recovered from the midden was a poorly preserved, unidentifiable tine fragment from either a deer or elk. The distal, pointed tip of the tine has been cut off and ground smooth; this is the only noticeable alteration to the piece. Most probably this antler section is a waste cast off.

A small, finely worked sliver of mammal bone was recovered from Feature 69 (Figure 16b). At its greatest extremes this element is 47 mm long, 4 mm wide, and 2 mm thick. The piece has a very flattened cross-section and was shaped by grinding three sides of the bone.

Figure 16. 40FR7. A. Cut and hollowed antler fragment. B. Small mammal bone awl. C. White-tailed deer first phalange altered for cup and pin game. D. White-tailed deer right humerus with "groove and snap" ring. E. Worked box turtle carapace.

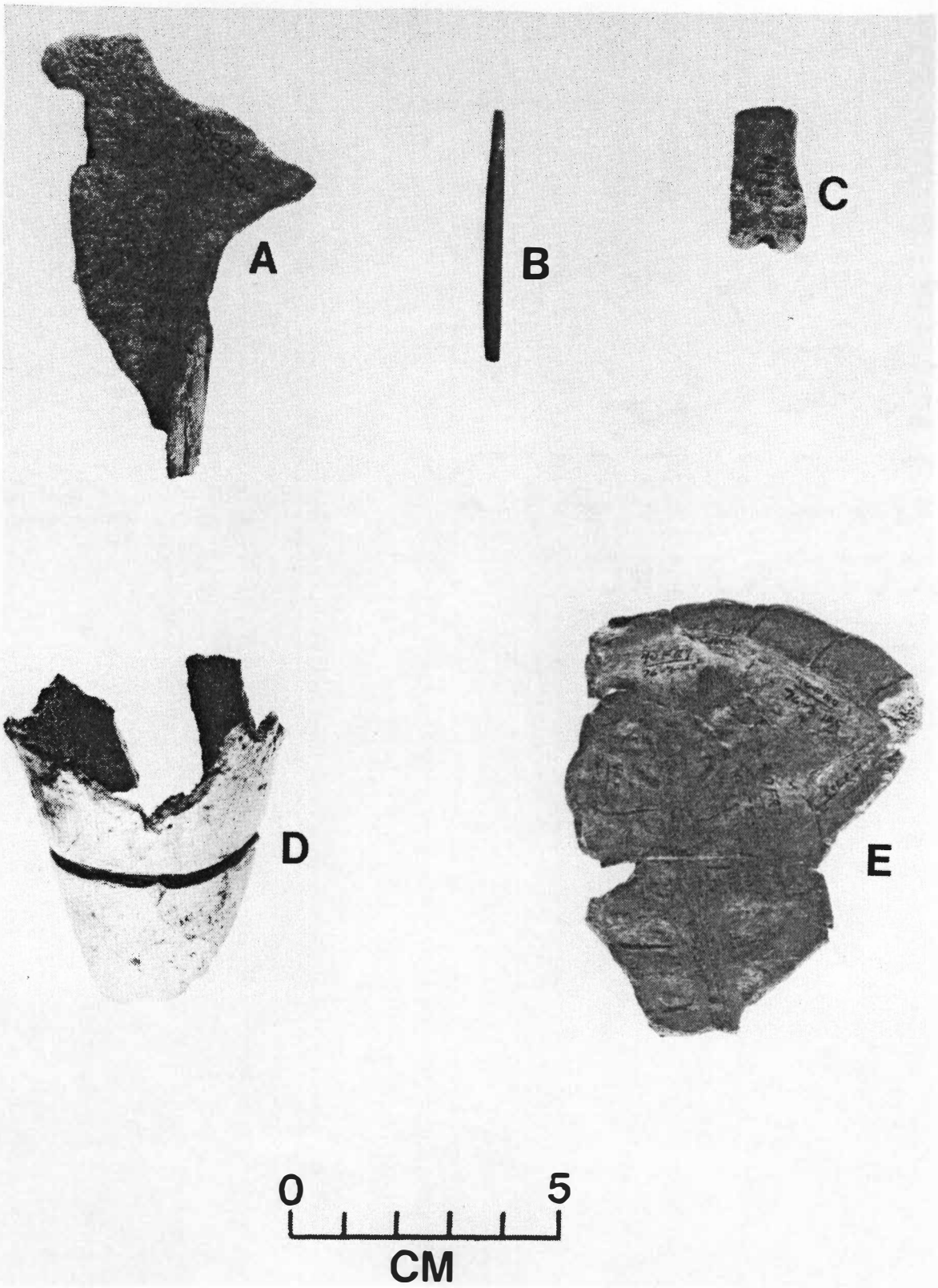

Figure 16.

Numerous grinding marks are still present on the bone's surface, and run perpendicular to its long axis. One end of the artifact tapers slightly more than the other and may have originally formed a point. This cannot be conclusively shown, however, since the very tip of the tapered end was broken away. The exact function of this tool is unknown, but it could have been a very small form of awl.

A white-tailed deer first phalange, altered to form the cup for a cup-and-pin game, was found in the midden (Figure 16c). Culin (1907) refers to this game as ring and pin in his study of North American Indian games. This piece is almost identical to the one found at 40BD46. After the proximal end of the phalange was cut off, the interior of the element was hollowed out and the cut edges of the piece were then smoothed and slightly polished. A hole was drilled through the distal end of the phalange so that a cord might be attached.

A cut and ground jaw fragment found in Feature 139 was one of the most diagnostic Middle Woodland bone artifacts to be recovered from 40FR7. This artifact was too fragmentary to identify to a specific level or to even state whether it was part of a maxilla or a mandible (all teeth were missing), but based upon the size and shape of the alveoli, it was probably from a large carnivore such as a cougar, wolf, or black bear. The jaw was cut parallel to its long axis through the roots of the teeth. The surface of the cut area was ground smooth and polished. Cut and ground jaws of this sort are commonly found associated with Middle Woodland Hopewellian cultures

and may have been religious symbols or hunting trophies (Parmalee 1959).

An excellent example of the "groove and snap" method of altering bone was found on a white-tailed deer right proximal humerus fragment from Feature 150 (Figure 16d). A deep ring had been cut around the circumference of the humerus shaft. When force was applied, the piece was supposed to have broken cleanly where the groove had been cut, but instead it broke downward below the ring. This fragment was most probably a discard.

Four large mammal long bone fragments, each altered in a similar manner, were recovered from Feature 115 and Postholes 198, 316, and 323. All four of the worked pieces are thick heavy bone fragments with highly polished outer surfaces. None of the fragments was complete enough to determine from what sort of tool it may have originated. The three fragments from the postholes display a number of scrape marks which run parallel to their long axes. The largest of the four fragments is 32 mm long and 12 mm wide, while the smallest is 22 mm long and 10 mm wide. During the analysis it was found that the tool fragments from Postholes 316 and 323 fit together and were obvously part of the same tool. Both of these postholes were located in the Central Expansion Area, approximately 1 meter from each other. This is additional evidence that animal bone often laid out for some time and was kicked about camp before being deposited in a feature.

Worked large mammal long bone fragments were recovered from

Features 92 and 126. The worked sliver found in Feature 92 is 27 mm long and 17 mm wide. One end of the bone was slightly rounded and smoothed by light grinding. No other alteration was noted on the piece; its function is unknown.

The fragment from Feature 126 appears to be waste discard that was removed by the "groove and snap" technique. Numerous deep scratch marks run down the long axis of the bone's outer surface. The piece is 24 mm long and 13 mm wide.

A small bird bone bead was found in unit 100N50E of the midden. The bead is 2.5 mm long, 3 mm wide, and appears to have been cut from a bird long bone. Both cut ends of the bead have been ground and slightly polished. The bead could have been strung by running a string through the natural inner bone canal.

The partial box turtle carapace recovered from Feature 147 was the only worked turtle shell found at 40FR7 (Figure 16e). Only a part of the posterior half of the carapace was found. The interior vertebrae and the shell margin were ground smooth. This fragment was most probably part of a turtle shell cup.

Seven worked shells or shell fragments were recovered from 40FR7. Two of these pieces were marine gastropods, two were freshwater pelecypods, and three were too fragmentary to determine their derivation.

Two marine gastropods, Marginella apicina, were found in the midden. Both have had their spires ground off so that a string could be threaded through the manufactured hole and the shell aperature. A similar bead was found at 40CF111.

Both of the worked freshwater mussel valves (1 right valve each of cf. Lampsilis ovata and Villosa cf. taeniata) were recovered from the midden. Eight small, evenly spaced notches were cut into the ventral margin of the Villosa valve. This was the only alteration to this shell, its function being unknown. The possible Lampsilis valve was radically altered. Only a section of the umbone was left intact; the ventral margin of the shell and the lateral and pseudocardinal teeth were cut away. Approximately half of the cut shell margin was ground smooth. Lampsilis ovata valves, because of their depth, were often used as dippers or spoons. It is possible that this fragment may have originally been part of such a utensil.

Three of the worked shell pieces could have been manufactured from either freshwater mussel shells or marine conch shells; all were too fragmentary to identify more specifically. Two of the fragments were recovered from the midden, while the third was found in Feature 16. The roughly rectangular piece from Feature 16 is 33 mm long, 19 mm wide, and 4 mm thick. Both faces and one end of this piece display numerous abrasion marks. The function of this artifact is unknown.

Both of the shell fragments from the midden are highly polished. No obvious function for either piece can be determined, although both may be cast-offs from a shell tool manufacturing process. One of the shell pieces is 16 mm long, 11 mm wide, and 9 mm thick, while the other is 29 mm long, 6 mm wide, and 5 mm thick.

A total of 20 human skeletal remains was recovered from 40FR7.

These remains can be divided into two basic groups, skeletal elements from newborn children and deciduous teeth from juveniles. The former were found in midden units 98N52E and 100N54E and in Features 121 and 132. Features 121 and 132 were located in units between the Western and Central Expansion areas. A right scapula, left femur, and left humerus were found in unit 98N52E; a right zygomatic was recovered from 100N54E. Three elements, a left tibia, fibula, and a zygomatic were found in Feature 121, while a third phalange was recovered from Feature 132. Developmentally all these elements were from a stillborn or recently newborn child. Although widely scattered, they all could have been from a single infant. Perhaps the infant was buried in the midden and later disturbed and scattered by dogs or human activity.

Based upon the scattered placement of the infant bones in the midden and features, it would appear that babies that were still born or died soon after birth were buried with little ceremony. Their placement in a waste midden does not reflect a high regard for their status as individuals. Similar infant burials (Burials 3 and 9) were found in the Owl Hollow midden outside of Structure II at the Banks III site (40CF108) (Faulkner and McCollough 1974).

The more common Owl Hollow method of disposing of the dead appears to have been cremation. At the Raus site (40BD46), two small pits (Features 3 and 4) were sampled and found to contain the remains of redeposited adult cremations. Another nearby unexcavated feature (Feature 1) similar to Features 3 and 4 was thought to also contain a

redeposited cremation. Feature 2 was a larger disturbance located among the previous features. It displayed evidence of prolonged *in situ* burning and is thought by Cobb and Faulkner (1978) to have been a crematory basin.

Infant death is common among primitive peoples. Owl Hollow children may not have been considered members of the group meriting formal mortuary ceremonies until they reached a given age or had a formal naming ceremony. Owl Hollow customs may have been similar to those of the LoDagaa in West Africa (Goody 1962: 149):

> An unweaned child is only a potential human being; he has not yet achieved a social personality. For the emergence of a new personality is not necessarily tied to the moment of birth. . . . For them a child is not entitled to a human burial until it has been weaned, a process that does not normally take place until the third year of its existence. . . . Thus the LoDagaa display no public grief at the death of an unweaned child, for it is not yet accorded human status.

The Mandan practiced a similar custom and buried unnamed children separately from recognized group members (Bowers 1950).

Twelve human teeth were found at 40FR7; 11 were deciduous, but one molar was too fragmentary to state whether it was a deciduous or permanent tooth. Six of the teeth were found in the two midden units (98N52E and 100N54E), two were found in the Central Expansion area (one in Posthole 142 and another in Feature 38), one in Feature 139 in the Eastern Expansion area, and two from Feature 107 which was located between the Western and Central Expansion areas. The deciduous teeth present at the site include: 2 central maxillary incisors, 2 right lateral maxillary incisors, 1 left first maxillary

molar, 1 second maxillary molar, 2 right lateral mandibular incisors, 2 canines (one definitely mandibular), and 1 partial first mandibular molar. Based upon the two right lateral maxillary incisors and the two right lateral mandibular incisors, these teeth were from at least two children.

All the deciduous teeth recovered from the Owl Hollow site appear to have been lost naturally. The roots of all the teeth had largely been reabsorbed, as happens when they loosen and fall out during childhood. Since human deciduous teeth are lost in a chronological pattern, it is possible to determine the approximate ages of some of the children who inhabited the Owl Hollow site. Whaley and Wong (1979) give the following as average ages for loss of deciduous teeth: central maxillary incisor--7.5 years; lateral maxillary incisor--8 years; first maxillary molar--10.5 years; second maxillary molar--10.5 years; lateral mandibular incisor--7 years; mandibular canine--9.5 years; and first mandibular molar--10 years. These teeth document that there were children between the ages of seven and ten and a half years at the site.

The Peters Site (40FR45)

The Peters or Furniture Store site, as it is also known, is located on a first terrace above what was formerly a prominent bend of the Elk River in north central Franklin County, Tennessee. This part of the Elk River was impounded by the Tennessee Valley Authority and now forms a part of Tims Ford Reservoir. The site is located at

the northeast corner of the former bend at river mile 163. Geographic coordinates for the site are 35° 15' 20" north latitude and 86° 07' 32" west longitude. The low terrace on which 40FR45 is found is quite broad, extending more than a mile east-west. Surface elevation of the site is 905 ft AMSL. Fox et al. (1958) characterize the site soil type as Sequatchie fine sandy loam, a medium to strongly acid, well drained, high yielding alluvial soil.

The Elk River lowlands, in which the Peters site is situated, are part of the Nashville Basin. But the upland areas of the Highland Rim, reaching elevations of 950-980 ft AMSL, are very near to the site, immediately north of the Elk River. The site area is demarcated by a dark brown refuse midden and abundant occupational debris covering an area approximately 500x500 ft. There are numerous water sources close to the site, the most prominent of which is the Elk River. A large artesian spring is located at the base of the terrace in front of the site, while Taylor and Rock creeks flow into the Elk River about one mile west of the site.

The Peters site was tested over a 10 day period in March of 1977. The main excavation area was located on the first terrace in a portion of the site characterized by dark brown-black midden with a dense surface scatter of lithics (Figure 17). Twenty-five square meters of disturbed plowzone were removed from this area, revealing an undisturbed midden averaging 10 cm in thickness. Below the midden were found 13 postholes and 15 features. The midden was removed in two arbitrary 5 cm levels. Except for those portions extending into

Figure 17. 40FR45. Phase III 1977 test excavations.

the unit profiles, nine features were completely excavated. Feature and posthole fill was processed through a 1/4 in mesh dry screen. Soil flotation samples were taken from seven of the deeper and larger features and from two postholes that contained large amounts of plant remains. The soil samples were processed with the Owl Hollow flotation device in the Knoxville laboratory.

Of the nine excavated features, only three (Features 1, 6, and 12) contained large amounts of cultural remains. Each of these three features contained stratified deposits and was classified as a storage pit (Cobb and Faulkner 1978). Feature 1 was roughly circular (100x80.9 cm) in plan and had a bell shaped profile. Feature 6 was also a bell shaped pit, but had an oval mouth measuring 86x143 cm. Although not completely excavated, since a portion of it extended into the unit wall, Feature 12 appeared to be a very large cylindrical pit, with an oval mouth measuring approximately 180 cm in diameter. Numerous ecofactual remains were found in these three stratified features. The midden deposit and Features 5, 10, and 11 also yielded faunal remains, but in much smaller quantities.

Based upon their size and shape, 13 subsurface disturbances were identified as postholes at 40FR45. Flotation samples were taken from two which contained large amounts of charcoal. Although there is no obvious patterning of these postholes, Cobb and Faulkner (1978) suggest they may have formed part of a shelter to protect the food stored in the storage pits.

Charcoal from Features 6 and 12 was submitted to the University

of Georgia for chronometric dating. Both features are deep storage/refuse pits and were believed, based upon their morphology and material contents, to be roughly contemporaneous. There was, however, considerable discrepency in the dates received from the two features. Feature 6 was dated at A.D. 780 ± 55 years (UGa-1765, 1170 ± 55 B.P.), while Feature 12 was dated at A.D. 480 ± 60 years (UGa-1776, 1470 ± 60 B.P.). Cobb and Faulkner (1978) believe that the A.D. 480 ± 60 years date is the more correct one for the site occupation, based largely on the material remains recovered. This would place 40FR45 within the middle period of Owl Hollow development (A.D. 400-600) (Cobb and Faulkner 1978).

Vertebrate and invertebrate faunal remains were quite numerous in the features at 40FR45. A total of 5,486 skeletal remains was found in six of the features, with another 26 elements in the midden. Four hundred and nine of these skeletal elements were identifiable to at least the order level (Table 27). Invertebrate remains consisted of 11 freshwater pelecypod valves and 18,091 freshwater gastropods.

As at the other Owl Hollow sites, mammal bone made up a majority of the vertebrate faunal remains. The 3,932 mammal bone pieces found at the site accounted for 71.33% of the total faunal sample. Only 102 of the mammal skeletal elements could be specifically identified; these were from at least eight different species. Skeletal remains from the white-tailed deer were most numerous with 75 elements in the collection. At least three individual deer are represented in the sample.

Table 27

Vertebrate Fauna Identified from the Peters Site (40FR45)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Opossum, *Didelphis marsupialis*	1	1	.24	8.50	1.23
Striped Skunk, *Mephitis mephitis*	2	1	.48	5.00	.72
Gray/Fox Squirrel, *Sciurus* spp.	5	1	1.22	.60	.08
Rice Rat, *Oryzomys palustris*	1	1	.24	-	-
Small Rodent sp.	1	1	.24	-	-
Cottontail, *Sylvilagus* cf. *floridanus*	14	2	3.42	3.50	.50
cf. Elk, *Cervus elephus*	2	1	.48	350.00	50.92
White-tailed Deer, *Odocoileus virginianus*	75	3	18.33	300.00	43.64
Deer, Cervidae	1	-	.24	-	-
Total Ident. Mammal Bone Pieces	102	11	24.89	667.60	97.09
Indet. Large Mammal Bone Pieces	282				

Table 27 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Indet. Small Mammal Bone Pieces	3,548				
Total Mammal Bone	3,932				
Birds					
Small Hawk sp.	1	1	.24	-	-
Turkey, *Meleagris gallopavo*	14	2	3.42	17.00	2.47
Total Ident. Bird Bone Pieces	15	3	3.66	17.00	2.47
Indet. Bird Bone Pieces	339				
Total Bird Bone	354				
Reptiles					
Stinkpot, *Sternotherus odoratus*	8	2	1.95	-	-
Turtle: Kinosternidae	4	1	.97	-	-
Box Turtle, *Terrapene carolina*	63	3	15.40	1.20	.17

Table 27 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Turtle: *Graptemys*/ *Chrysemys* spp.	2	1	.48	1.50	.21
Turtle, spp.	90	-	22.00	-	-
Snake: Colubridae	9	1	2.20	-	-
Snake: Crotalidae	5	1	1.22	-	-
Snake, spp.	37	-	9.04	-	-
Total Ident. Reptile Bone Pieces	218	9	53.26	2.70	.38
Amphibians					
Hellbender, *Cryptobranchus alleganiensis*	2	2	.48	-	-
Frog, *Rana* sp.	2	1	.48	-	-
Total Ident. Amphibian Bone Pieces	4	3	.96	-	-
Fish					
Gar, *Lepisosteus* sp.	1	1	.24	-	-

Table 27 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Minnow sp., Cyprinidae	1	1	.24	-	-
Northern Hogsucker, *Hypentelium nigricans*	1	1	.24	-	-
Redhorse, *Moxostoma* spp.	4	2	.97	-	-
Sucker spp., Catostomidae	11	4	2.68	-	-
Catfish, *Ictalurus* spp.	4	2	.97	-	-
Madtom, *Noturus* spp.	2	2	.48	-	-
Catfish spp., Ictaluridae	3	2	.73	-	-
Bass, *Micropterus* spp.	2	1	.48	-	-
Sunfish spp., Centrarchidae	37	5	9.04	-	-
Freshwater Drum, *Aplodinotus grunniens*	4	1	.97	-	-
Total Ident. Fish Bone Pieces	70	22	17.04	-	-
Indet. Fish Bone Pieces	934				
Total Fish Bone	1,004				

Table 27 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Total All Ident. Bone	409	48	99.81	687.30	99.94
Total All Indet. Bone	5,103				
Total All Bone	5,512				

The probable elk elements found at the site consisted of two 10 in long sections of antler beam, each with a single tine. In comparing the specimens with elk and deer antlers housed in the University of Tennessee Zooarchaeology Skeletal Collection, the antler fragments were found to most closely resemble those of an elk in size and morphology. One of the antler segments was recovered from Feature 6, while the other was found in Feature 12. Only a single animal is thought to be represented by these two elements. Based strictly on the amount of meat potentially contributed to the diet, it would appear that this one elk was the most important meat resource at 40FR45. This, however, would be an over simplistic interpretation of the data. It is also possible that the antlers were picked up after being shed naturally.

Elk appear never to have been very numerous east of the Mississippi River. Although they were extirpated in Tennessee shortly after the arrival of European colonists, the Elk River from its name would suggest that they were known historically in the project area. Based upon the number of skeletal elements in the sample, MNI, and potential usable meat per individual, the white-tailed deer rather than the elk must be considered the most important animal to the Indian diet at 40FR45. The elk may have been taken when encountered but was not killed frequently enough to be considered a mainstay in the diet.

Other mammals represented in the 40FR45 faunal collection and thought to be food resources include the opossum, striped skunk,

gray/fox squirrel, and the cottontail. While the meat yields for these animals are much less than that for the white-tailed deer, they would have been important meat supplements to the diet when deer meat was unavailable.

The remains of the rice rat and the indeterminate small rodent are thought to be natural inclusions at the site. Rats and mice, as now, would have eaten man's refuse and pilfered his stores. Their burrows were probably located near the site. A number of these rodents can be expected to have expired naturally at the site, or to have been killed by dogs or people when found in the camp.

Of the 354 bird skeletal remains found at the site, only 15 were specifically identifiable. One of these was from an indeterminate species of small hawk and 14 were from the turkey. There was a minimum of two turkeys represented in the bone sample.

The indeterminate species of small hawk could have been a meat resource, but more likely it was captured to use its feathers or body parts as decorative items, or its whole skin as a totem object.

Four egg shell fragments were found at the site. As at 40BD55 and 40FR7 the presence of egg shell in the faunal samples suggests that the Owl Hollow inhabitants used eggs as supplemental sources of protein and nourishment in their diet.

There were 218 reptile skeletal remains noted in the 40FR45 faunal sample. All were identifiable to at least the order level. Reptiles made up only 3.95% of the total bone at the site, but 53.30% of the identifiable elements.

Skeletal elements from at least three species of turtles (stinkpot, box turtle, and Graptemys/Chrysemys spp.) were found at 40FR45. Most common were the remains of box turtles (63 elements). Box turtles are slow, timid, and easily captured. They may have been desired as much for their shells, which were often used for utensils, as for their meat.

Aquatic turtles would have been more difficult to capture than terrestrial species such as the box turtle. Most aquatic species are very elusive in their element and can be vicious when captured. In all probability they were taken in nets while fishing.

The remains of both colubrid and crotalid snakes were found at 40FR45. Species from either of these groups could have been found near the camp. Snakes, like the turtles, would have been meat supplements in the Owl Hollow diet.

Amphibian remains were poorly represented in the 40FR45 collections; only four elements were found. Two of these skeletal fragments were from a hellbender and two were from an indeterminate species of frog. While the frog may be explained as a natural occurrence at the site, the hellbender is a thoroughly aquatic salamander and could only have been brought to the site by human intervention. Remains of hellbenders are commonly found at Owl Hollow sites and apparently were considered a desirable food resource. Frogs may also have been utilized when captured. Amphibians may be considered only very minor supplements to the Owl Hollow diet.

Of the 1,004 fish bones recovered from 40FR45, only 70 elements lent themselves to more specific identification. These remains were from at least eight species of fish. Fish scale fragments were also found, but most were too small to identify more specifically. Some of the larger fragments, however, appear to have been cycloid scales similar to those found on catostomid fishes.

Sunfish were the most commonly represented group in the collection with 39 skeletal elements. Two of the skeletal elements were identified as Micropterus sp., but the remainder could only be recognized as being from the family Centrarchidae. Thirteen species of centrarchids representing four genera have been recently collected from the Elk River (Appendix A).

The second most numerous fish group in the faunal collection were the suckers, with 16 skeletal elements. Eleven of these elements could be identified only as belonging to the family Catostomidae; one was from a northern hogsucker, and four were from an indeterminate species of redhorse.

Catfish were also well represented at the site with nine elements. Four were from the genus Ictalurus and two were from the genus Noturus. The remainder could be identified only as belonging to the family Ictaluridae.

The remains of three other fish species could be identified as being present at 40FR45. These include the freshwater drum, an indeterminate species of gar, and an unknown species of minnow. Three gar species and 29 species of minnows presently occur in the Elk River.

The species makeup of the fish assemblage found at 40FR45 closely resembles those of 40BD55 and 40FR7. As with these collections, the one from 40FR45 is noteworthy primarily for the diversity of habitats in which these species would have been found. As will be pointed out in more detail later, it is believed that the Owl Hollow peoples sought out fish in a number of habitats and most often used a general means of capture, i.e. nets, fishtraps and weirs.

Freshwater mussels were recovered from two features at 40FR45, Features 6 and 12. Both were deep, stratified storage/refuse pits. In each, the mussel valves are from the two lowermost strata, and are mixed in ash deposits with freshwater snail shells and animal bone fragments. Only five species were recognized from the 11 identifiable valves found in these two features (nine valves were from Feature 6 and two were from Feature 12) (Table 28). Three of the species, Fusconaia barnesiana, Lexingtonia dolabelloides, and Ptychobranchus subtentum are Cumberlandian species, as may be the Villosa sp. Lexingtonia dolabelloides and P. subtentum were the most abundant species in the collection, with three and four identified valves respectively. All the recovered valves are small, compact forms that are characteristically found in small stream or headwater areas.

These mussels were almost certainly recovered from the Elk River at a location near to the site. The overwhelming majority of them are species which are most commonly found in riffle areas in

Table 28

Pelecypoda from the Peters Site (40FR45)

Species	Valves	MNI	Percent Of Total
Fusconaia barnesiana*	1	1	9.09
Lexingtonia dolabelloides*	3	2	27.27
Fusconaia/Lexingtonia sp.	1	1	9.09
Ptychobranchus subtentum*	4	3	36.36
Villosa sp.	1	1	9.09
Lampsilis fasciola	1	1	9.09
Total Ident. Pelecypods	11	9	99.99

* Cumberlandian species.

sand/gravel substrates (Warren 1975). The mussels and the pleurocerid snails were both probably gathered at the same time from the same locations.

At 40FR45 there were 18,091 identifiable freshwater snail shells from at least six different species and five genera (Table 29). All aquatic snail shells were recovered from Features 1, 6, and 12. There were 11,855 shells (65% of the total) found in Feature 6, 6,190 shells (34% of the total) in Feature 12, and 46 shells (.25% of the total) in Feature 1. Each of the three features, as previously mentioned, was a large storage/refuse installation.

In Feature 6 the shells are nearly equally divided with 5,693 specimens found in the lowermost ash levels and 6,162 specimens in the upper dark brown deposits. Freshwater snails in Feature 12 were largely found in the lower ash levels (5,404 specimens). Only 786 were noted in the upper dark brown soil levels. Cobb and Faulkner (1978) feel that the ash deposits and their associated faunal remains were thrown into the features in the spring, after the stored food contents had been removed during the winter. The upper dark brown levels are believed to have been deposited during the summer/early autumn period. Based upon this assumption, most of the freshwater snails at 40FR45 would appear to have been utilized in the spring, with some use continuing into the summer/early autumn (61% of the total combined shells in Features 6 and 12 were in the lower ash levels, versus 39% in the upper dark brown soil levels).

Pleurocerid snails made up 99.94% of the 40FR45 shell sample;

Table 29

Freshwater Gastropoda from the Peters Site (40FR45)

Species	Pieces	MNI	Percent Of Total
Freshwater Gastropods			
Lithasia verrucosa form *lima*/*L. geniculata* form *fuliginosa*	8,572	8,572	47.38
Lithasia obovata	262	262	1.44
Lithasia sp.	6,237	6,237	34.47
Pleurocera canaliculatum	2,492	2,492	13.77
Goniobasis laqueta/*edgariana*	81	81	.44
Leptoxis subglobosa	442	442	2.44
Viviparous georgianus	5	5	.02
Total Ident. Freshwater Gastropods	18,091	18,091	99.96

only five of the 18,091 identifiable specimens were viviparid snails. This descrepency in numbers overwhelmingly supports the idea that the Owl Hollow peoples specifically gathered those snail species which were most abundant and easily accessible, i.e. those pleurocerid species which are generally found clinging to rock outcrops or bottom gravels in shallow riffle areas. All of the 40FR45 pleurocerid species were probably found in nearby colonies in the Elk River.

In comparing the 40FR45 and 40FR7 freshwater gastropod assemblages (see Tables 23 and 29 on pages 185 and 251) a number of similarities and differences may be noted. With the exception of Campeloma sp. all other species found at 40FR7 were present at 40FR45 but usually in different proportions. Although the proportional differences are often considerable (at 40FR45 L. obovata make up 1.44% of the sample as compared to 24.38% at 40FR7), they are not thought to be the result of selective collecting by the Indian occupants of the two sites. Pleurocerid snail species are found in colonies in stream locations favorable to their existence. The proportional representation of species within these colonies varies considerably, and often appears to be determined as much by chance as environmental conditions. Indians at the two sites probably utilized those pleurocerid species most numerous in the colonies closest to their living areas. Differences in the proportional species makeup of the colonies thus produced differences in the numbers of each species collected by the Indians.

In summary, the faunal exploitation pattern displayed at 40FR45

is extremely similar to that found at 40FR7, 40BD55, and the other Owl Hollow sites thus far examined. Mammals were the principal source of meat at the site; they are believed to have contributed approximately 97% of the calculable meat weight at 40FR45. The white-tailed deer is thought to have been the most desired meat resource. Less frequently taken mammals such as the opossum, striped skunk, gray/fox squirrel, cottontail, and elk would have been important meat supplements to the diet.

As a group, birds appear to have been under-utilized. Only two turkeys and a hawk were represented in the 40FR45 faunal sample.

Amphibians are even more poorly represented at the Peters site. While hellbenders and frogs would have constituted only very minor contributions to the diet, their presence illustrates the broad range of resources that the Owl Hollow peoples obviously considered to be edible foods items.

Based upon the number of skeletal elements and different species represented in the faunal collection, reptiles and fish appear to have been utilized with some consistency by the site inhabitants. Both groups, however, were probably only supplements in the diet. Freshwater gastropods and pelecypods can be viewed in much the same manner. While not major meat resources at 40FR45, mollusks would have been important as dietary supplements, possibly when other meat resources were not available.

Taken individually those species considered to be dietary supplements were not significant to the maintenance of the diet.

When considered as a group, however, they supplied more meat than the white-tailed deer. Their importance to the Owl Hollow peoples was two fold. Foremost, they were sources of needed meat protein and secondly they added variety to the diet.

A number of the animal species found at 40FR45 may be used as seasonal indicators of the site's occupation. These include some of the reptile, amphibian, and mollusk species, and the bird egg shell fragments. The bird egg shell fragments show that the site inhabitants were securing this food resource during the spring and early summer.

The box turtle and snakes found at the site are probably the most habitat sensitive of the reptiles. These animals hibernate during the cold weather months of the year and emerge in the late spring only when the weather has warmed sufficiently to increase and maintain their normal body temperatures.

Each of the amphibian species would have been active only during the warm weather months. Both the hellbender and the unknown species of ranid frog would have burrowed into the mud to hibernate during the winter.

As noted earlier, the freshwater snails and mussels found in Features 6 and 12 may be used as seasonal indicators if it is assumed that they were found in storage features that were emptied of their contents in the late winter and early spring. A majority of the mollusks were found in the bottom of these features and are believed to have been deposited there in the spring. Those found at higher

levels in the features are thought to have been harvested during the summer and early autumn.

Although no house structure remains were found at the site, the presence of deep storage pits suggests that plant foods were stored there for winter utilization. Also, the dark brown midden soil found at the site is similar to middens found near the remains of winter houses at other Owl Hollow sites.

Features 1, 6, and 12 produced a large number of plant remains. These include, in part, hickory nuts, acorns, chestnuts (Castanea dentata), walnuts, goosefoot, knotweed, maygrass, grapes, sunflower, gourd (Lagenaria siceraria), squash, and maize. The nut crops, goosefoot, knotweed, sunflower, gourd, squash, and maize would have been ripe for harvest in the late summer and autumn. All these plant foods could have been stored for consumption during the winter. Maygrass ripens in the late spring and summer, and grapes would be available in the latter part of summer.

The faunal and floral seasonal indicators suggest that the site was occupied during the spring, summer and autumn. The presence of storage features and the midden deposit strongly argue for a year round occupation.

Three skeletal elements with butchering cut marks were found at the Peters site. All three elements were from the white-tailed deer and consisted of an astragulus from Feature 6 and a calcaneum and astragulus from Feature 12. The astragulus and calcaneum articulate with each other to form part of a very tight ankle joint in the deer.

This joint between the distal tibia and the proximal metatarsal is very difficult to separate and cut marks are often found on these elements.

Only a single worked skeletal element, a section of antler from either a white-tailed deer or elk, was recovered from 40FR45. One side of the antler fragment has been ground smooth and displays a high degree of polish. Numerous light scrape marks randomly crisscross the polished area. Since this piece has been broken and heavily burned, it is possible that it was formerly part of a larger tool whose function remains unknown. The fragment has a maximum length of 53 mm, and a width of 15 mm.

The Hamby Site (40CF214)

The Hamby site is located approximately 200 m east of Betsy Willis Creek at coordinates 35° 20' 11" north latitude and 85° 54' 50" west longitude in the extreme southeastern portion of Coffee County, Tennessee. Betsy Willis Creek is a first order tributary of the Elk River, which lies approximately three miles to the south of the site. The site is located in a 40 acre field on the rim of an old sink hole in a karst area. Dark brown soil and cultural materials scattered on the field surface delimit the site boundaries. Cumberland silt loam, the site soil type, is characterized as a medium to strongly acid soil, with medium internal drainage (Love et al. 1959).

Located on the flat Highland Rim, the Hamby site has an

elevation of approximately 1020 ft AMSL. Within a mile of 40CF214 is the western escarpment of the Cumberland Plateau, which rises in this area to heights of at least 1500 ft AMSL. The Hamby site's location on such a minor tributary of the Elk River may in part be related to the proximity of the nearby Cumberland Plateau. Resources from two physiographic provinces would have been within easy reach.

Eighteen 2x2 m test units were excavated at the Hamby site during the 10 day testing period in March of 1977 (Figure 18). Nine features and three isolated postholes were found during these excavations. A majority of these features were nondescript, shallow, oval disturbances which contained very little cultural material. The three exceptions to this were Features 1, 7, and 8. Feature 1 contained the very poorly preserved remains of a fully extended human burial. It was impossible to state whether this was an Owl Hollow burial since no burial goods or other cultural remains were found in the grave. This is a multicomponent site and Feature 1 was widely separated from the recognizable Owl Hollow features.

Features 7 and 8 were both stratified pits thought to have originally served as storage facilities (Cobb and Faulkner 1978). Only three-fourths of Feature 7 was excavated due to time limitations. There were three levels of fill within this feature, a basal layer of ash mixed with ecofactual, lithic, and ceramic materials, a middle level of light brown fill, and an upper layer of dark brown midden soil.

Feature 8 was a large cylindrical pit with three levels of fill.

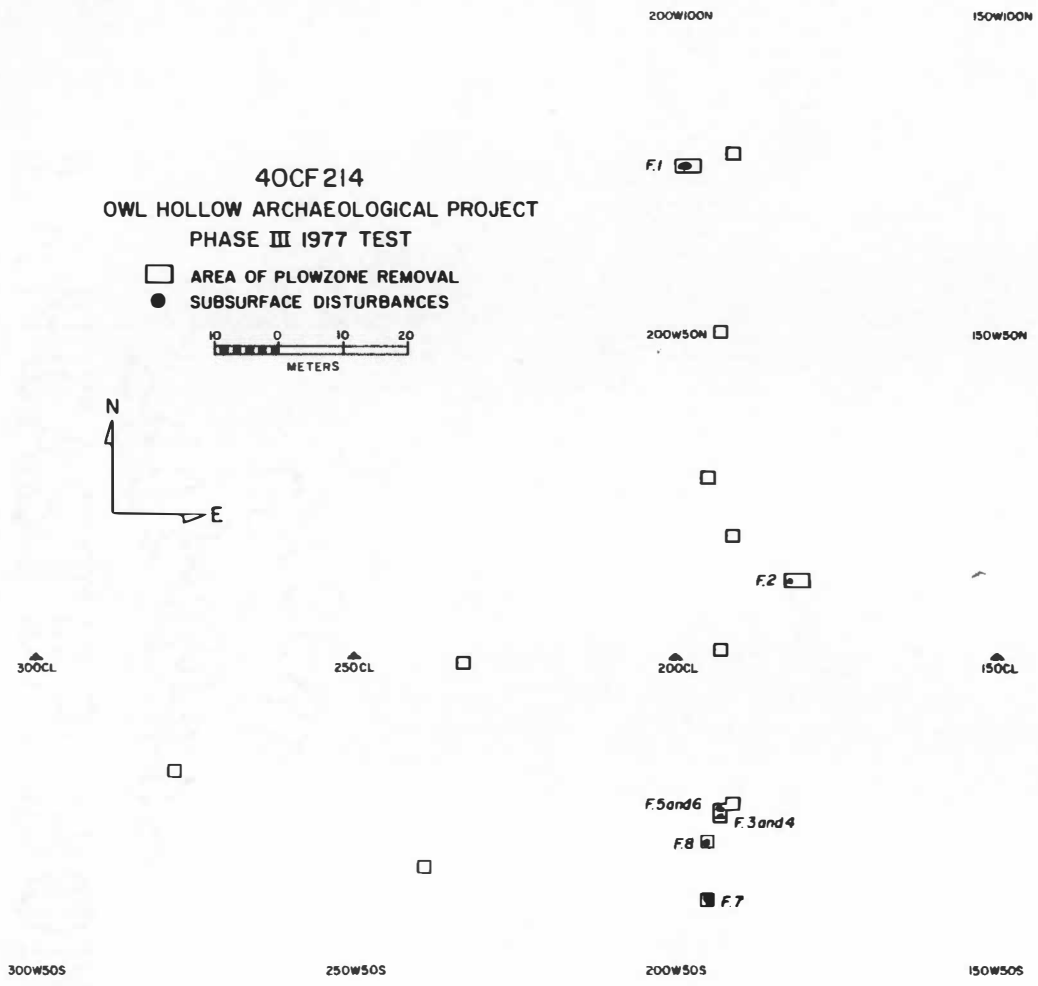

Figure 18. 40CF214. Phase III 1977 test excavations.

The lower-most level (Level III) was a localized lens of unfired clay, while level II was a massive layer of at least five different species of whole charred hickory nuts. Level I, which sealed the feature, was made up of a dark brown midden layer, mixed with fire cracked rocks and numerous Owl Hollow ceramics.

The fill from Features 7 and 8 was carefully hand sorted since it was not possible to use a water screen and the soil at the site was too wet to pass through a 1/4 in mesh dry screen. Numerous soil samples were, however, taken from the features for flotation. All of Level II in Feature 8 was returned to the lab for flotation since it was almost a solid deposit of complete charred hickory nuts.

Two radiocarbon determinations were obtained for 40CF214. Both were obtained from the same layer of charred hickory nuts at the bottom of Feature 8. One sample was sent to the Geochron Laboratories Division and the other to the University of Georgia. Both dates received are extremely late, A.D. 905 ± 110 years (GX-4921, 1045 ± 110 B.P.) from the Geochron sample and A.D. 810 ± 55 years (UGa-1766, 1140 ± 55 B.P.) for the University of Georgia sample. Based upon the cultural materials recovered from the feature, Cobb and Faulkner (1978) feel that these dates are approximately 200 years too late. Three explantions are offered by Cobb and Faulkner (1978: 117) to account for these late dates.

> . . . (1) the charred nut layer was somehow contaminated after secondary deposition; (2) Feature 8 was dug by later groups through a late Middle Woodland midden and filled with Middle Woodland debris; or (3) Feature 8 and its inclusive remains were left by people with a modified late Middle Woodland tradition of tool, weapon, and pottery

manufacture who were now utilizing marginal sites possibly due to population pressures from Owl Hollow or alien groups.

It is unknown which, if any, of these explanations is correct. In any case, it is obvious that site 40CF214 dates to the late period of Owl Hollow development (post A.D. 600) (Cobb and Faulkner 1978).

Both vertebrate and invertebrate remains were found at the site, but they were present only in very small numbers and were often poorly preserved. A total of 1,781 bone fragments was recovered from 40CF214. Of these only 64 were identifiable to at least the order level (Table 30).

Mammal bone made up a majority of the vertebrate remains, 95.17% of the total. The 30 identifiable mammal elements accounted for 46.86% of the total identifiable remains. Twenty of the identifiable elements were from the white-tailed deer. The white-tailed deer was represented at the site by at least three individuals (based upon the presence of three right proximal radii) and is felt to have been the most important animal in the diet of the peoples at 40CF214.

The gray/fox squirrel, cottontail, and an indeterminate species of rodent were represented by smaller numbers of elements. The squirrel and rabbit are definitely believed to have been supplements to the diet, but the mouse-size rodent could have been a natural inclusion.

Only one of the 27 bird bones found at the site could be specifically identified. This was a radius fragment from a turkey. Based upon the amount of meat potentially contributed the turkey may have been the second most important meat resource at the site.

Table 30

Vertebrate Fauna Identified from the Hamby Site (40CF214)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Mammals					
Gray/Fox Squirrel, *Sciurus* spp.	2	1	3.12	.60	..19
Small Rodent sp.	1	1	1.56	-	-
Cottontail, *Sylvilagus* cf. *floridanus*	7	1	10.93	1.75	.56
White-tailed Deer, *Odocoileus virginianus*	20	3	31.25	300.00	96.38
Total Ident. Mammal Bone Pieces	30	6	46.86	302.35	97.13
Indet. Large Mammal Bone Pieces	137				
Indet. Small Mammal Bone Pieces	1,528				
Total Mammal Bone	1,695				

Table 30 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Birds					
Turkey, *Meleagris gallopavo*	1	1	1.56	8.50	2.73
Total Ident. Bird Bone Pieces	1	1	1.56	8.50	2.73
Indet. Bird Bone Pieces	26				
Total Bird Bone	27				
Reptiles					
Turtle: Kinosternidae	1	1	1.56	-	-
Box Turtle, *Terrapene carolina*	10	1	15.62	.40	.12
Turtle, spp.	9	-	14.06	-	-
Snake: Colubridae	1	1	1.56	-	-
Snake, spp.	9	-	14.06	-	-
Total Ident. Reptile Bone Pieces	30	3	46.86	.40	.12

Table 30 (continued)

Species	Pieces	MNI	Percent Of Total	Est. Lbs. Of Meat	Percent Of Total Meat
Amphibians					
Toad, *Bufo* sp.	1	1	1.56	-	-
Toad, *Scaphiopus/Bufo* sp.	1	-	1.56	-	-
Total Ident. Amphibian Bone Pieces	2	1	3.12	-	-
Fish					
Redhorse, *Moxostoma* sp.	1	1	1.56	-	-
Total Ident. Fish Bone Pieces	1	1	1.56	-	-
Indet. Fish Bone Pieces	26				
Total Fish Bone	27				
Total Ident. Bone	64	12	99.96	311.25	99.98
Total All Indet. Bone	1,717				
Total All Bone	1,781				

There were 30 identifiable reptile skeletal elements in the site faunal sample. These made up 46.86% of the identifiable remains. As at the other sites, reptiles would have made up only a very small percentage of the meat contributed to the diet. The box turtle with 10 elements was the most abundant of the reptile species in the collection. Both it and the colubrid snake could have been picked up from the vicinity of the camp. The aquatic turtle from the family Kinosternidae may have been taken from Betsy Willis Creek.

Two amphibian elements were found in the faunal materials, one from the genus Bufo and the other either Bufo or Scaphiopus. Both are believed to be natural inclusions at the site.

Of the total 27 fish bones in the faunal sample only a single element could be more specifically identified. This was a urohyal from the genus Moxostoma. Skeletal remains from species of Moxostoma and other related catostomid fishes are numerous at Owl Hollow sites and they must have been commonly used as meat resources.

One identifiable freshwater snail, a Lithasia verrucosa form lima/L. geniculata form fuliginosa was recovered from 40CF214. This specimen and a few fragments of mussel shell were found in Level II of Feature 8, the hickory nut layer. The freshwater snail shell was probably thrown into the pit at the same time as the hickory nuts.

The Lithasia specimen from Feature 8 was most likely collected from the nearby Betsy Willis Creek. No recent collections of freshwater snails have been made from this creek, but based upon the stream's small size near the site, it is doubtful that it would have

supported a large population of mollusks. This in part may explain their rarity at the site.

The faunal sample from 40CF214 is very small and by itself would contribute little to the understanding of the Owl Hollow faunal exploitation pattern. Its significance lies in its striking similarity to the other Owl Hollow faunal collections. At 40CF214 and each of the other sites mammals, and the white-tailed deer in particular, provided the majority of the meat in the Owl Hollow diet. Other vertebrates and invertebrates provided lesser quantities of protein. They were, however, important as supplementary meat resources that contributed needed protein and variety in the diet. In the Eastern Woodlands it would not have been possible to rely solely on one meat resource without overexploiting it and seriously reducing its numbers. The formula for success was to utilize a wide variety of animals on a seasonal basis as they became most available or desirable. More will be said on this in the concluding chapter.

A single worked bone was recovered from 40CF214. This element was a badly burned right distal humerus fragment from a white-tailed deer. Only a small area on the medial side of the bone, just above the top of the articular condyle, was altered. This portion of the bone is highly polished and displays numerous scratch marks. The function of such an alteration is unknown. No skinning or butchering cuts were noted on any of the skeletal elements from 40CF214.

CHAPTER IV

OVERVIEW OF OWL HOLLOW FAUNAL EXPLOITATION

After examining the faunal remains found at each of the eight sites analyzed for this study (40CF108, 40CF111, 40CF32, 40BD46, 40BD55, 40FR7, 40FR45, and 40CF214), it is believed that a general pattern of Owl Hollow faunal utilization can be recognized. In spite of the differences in site chronology and geographic placement this pattern seems to be relatively consistent. More detail on this pattern will be provided in the final summation of this chapter. A brief review of Owl Hollow plant utilization and its interaction with animal exploitation will also be presented.

First, as part of the overview of the Owl Hollow faunal exploitation pattern, the animal species present at the eight sites will be more closely examined. In the individual site discussions little specific detail was given on the exploited species. The discussions generally focused only on the importance of the different animals to the diet. In the following, emphasis will be placed not only on their nutritive value, but also on their seasonal availability, numerical abundance in the samples, and secondary uses as tools, hides, medicines, spiritual objects, and status symbols. Based upon their presumed order of importance to the Owl Hollow diet, vertebrate species will be examined first and mollusk species descriptions will follow. Mammals will be the first group to undergo

scrutiny. For comparative purposes Table 31 presents the identifiable vertebrate materials from each of the eight Owl Hollow sites.

Chordata

Mammalia

Based upon the findings of this study, mammals are believed to have been the most important animal group in the Owl Hollow diet. The remains of 29 species of mammals, not including the human remains, were found associated with the eight Owl Hollow sites examined here. At each of the eight sites mammal bone made up a majority of the recovered vertebrate material. Mammal bone accounted for between 67 and 97% of the total vertebrate sample at each of the sites (92.46% for 40CF108, 97% for 40CF111, 95.02% for 40CF32, 85.15% for 40BD46, 67.23% for 40BD55, 73.36% for 40FR7, 71.33% for 40FR45, and 95.17% for 40CF214). Additionally, mammal bone usually accounted for a major percentage of each site's identifiable vertebrate remains. At each of the eight sites mammals are believed to have been the principal source of animal protein in the diet.

Opossum skeletal remains were found at four of the sites, two elements at 40CF111, one each at 40BD46 and 40FR45 and 15 at 40FR7. These skeletal fragments represent at most only a single individual at each site. Based upon its low representation in the faunal samples, the opossum would appear to have been only a supplement to the Indian diet. Most cultural groups in the Southeast ate opossums,

Table 31

Identifiable Vertebrate Fauna from All Owl Hollow Sites

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Mammals								
Opossum, *Didelphis marsupialis*	-	2	-	1	-	15	1	-
Eastern Mole, *Scalopus aquaticus*	1	-	-	-	-	5	-	-
Least Shrew, *Cryptotis parva*	-	-	-	-	-	2	-	-
Short-tailed Shrew, *Blarina brevicauda*	-	-	-	-	-	4	-	-
Raccoon, *Procyon lotor*	-	3	-	1	7	61	-	-
Long-tailed Weasel, *Mustela frenata*	-	-	-	-	-	5	-	-
Mink, *Mustela vison*	-	-	-	-	-	3	-	-
Otter, *Lutra canadensis*	-	-	-	-	-	1	-	-
Striped Skunk, *Mephitis mephitis*	-	-	-	1	1	23	2	-
cf. Striped Skunk, *Mephitis mephitis*	-	-	-	-	1	-	-	-
Gray Fox, *Urocyon cinereoargenteus*	-	-	-	-	-	10	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
cf. Gray Fox, *Urocyon cinereoargenteus*	-	-	-	-	1	-	-	-
Fox sp.	-	-	-	-	-	10	-	-
Domestic Dog, *Canis familiaris*	-	-	-	1	2	181	-	-
cf. Domestic Dog, *Canis familiaris*	-	-	-	-	-	5	-	-
Dog/Fox, Canidae	-	-	-	-	5	8	-	-
Cougar, *Felis concolor*	-	-	-	-	-	1	-	-
Woodchuck, *Marmota monax*	1	-	-	2	2	27	-	-
Eastern Chipmunk, *Tamias striatus*	-	1	-	14	-	15	-	-
Gray Squirrel, *Sciurus carolinensis*	-	-	-	-	-	1	-	-
Fox Squirrel, *Sciurus niger*	-	-	-	-	1	4	-	-
cf. Fox Squirrel *Sciurus niger*	-	-	-	-	5	-	-	-
Gray/Fox Squirrel, *Sciurus* spp.	-	3	-	5	28	255	5	2
Beaver, *Castor canadensis*	-	-	-	2	2	5	-	-
White-footed/Deer Mouse, *Peromyscus* spp.	-	-	-	-	3	34	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
cf. White-footed/Deer Mouse, *Peromyscus* spp.	-	1	-	-	-	-	-	-
Eastern Woodrat, *Neotoma floridana*	-	-	-	-	-	1	-	-
Rice Rat, *Oryzomys palustris*	18	3	-	-	-	23	1	-
Hispid Cotton Rat, *Sigmodon hispidus*	-	5	-	-	1	-	-	-
Southern Bog Lemming, *Synaptomys cooperi*	-	2	-	-	2	-	-	-
Pine Vole, *Microtus pinetorum*	-	2	-	-	1	31	-	-
Vole, *Microtus* spp.	-	-	-	-	1	3	-	-
Muskrat, *Ondatra zibethica*	-	-	-	-	-	4	-	-
Meadow Jumping Mouse, *Zapus hudsonius*	-	-	-	-	1	-	-	-
Porcupine, *Erethizon dorsatum*	-	-	-	-	-	1	-	-
Small Rodents spp.	-	41	1	2	35	289	1	1
Cottontail, *Sylvilagus floridanus*	2	3	-	-	63	149	14	7
cf. Elk, *Cervus elephus*	-	-	-	-	-	-	2	-
White-tailed Deer, *Odocoileus virginianus*	14	8	5	62	59	389	75	20

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Deer,								
Cervidae	-	-	-	-	1	3	1	-
Human,								
Homo sapiens	-	1	-	-	-	20	-	-
Birds								
Canada Goose,								
Branta canadensis	-	-	-	-	-	5	-	-
Duck sp.	-	-	-	-	-	1	-	-
Hawk sp.,								
cf. Buteo sp.	-	-	-	-	-	2	-	-
Hawk sp.	-	-	-	-	-	1	1	-
cf. Ruffed Grouse,								
Bonasa umbellus	-	-	-	-	-	1	-	-
Bobwhite,								
Colinus virginianus	-	-	-	-	3	8	-	-
Turkey,								
Meleagris gallopavo	-	-	-	5	11	34	14	1
Sandhill Crane,								
Grus canadensis	-	-	-	-	-	1	-	-
Passenger Pigeon,								
Ectopistes migratorius	-	-	-	-	-	1	-	-
Mourning Dove,								
Zenaida macroura	-	-	-	-	-	1	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Screech Owl, *Otus asio*	-	-	-	-	-	2	-	-
Small Owl sp.	-	-	-	-	-	1	-	-
Common Crow, *Corvus brachyrhynchos*	-	-	-	-	-	1	-	-
Passerine spp.	1	-	-	-	3	9	-	-
Reptiles								
Snapping Turtle, *Chelydra serpentina*	2	1	-	1	-	2	-	-
Stinkpot, *Sternotherus odoratus*	-	-	-	-	-	5	8	-
Stinkpot, *Sternotherus* cf. *odoratus*	3	4	-	-	-	-	-	-
Mud Turtle, *Kinosternon subrubrum*	-	-	-	-	-	8	-	-
Turtle: Kinosternidae	-	-	-	-	10	271	4	1
Box Turtle, *Terrapene carolina*	-	11	-	74	165	344	63	10
cf. Box Turtle, *Terrapene carolina*	-	3	-	-	-	-	-	-
Map Turtle, *Graptemys geographica*	1	-	-	-	-	-	-	-
cf. Map Turtle, *Graptemys* sp.	1	-	-	-	-	-	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Turtle: *Graptemys*/ *Chrysemys* spp.	-	-	7	1	21	12	2	-
Softshell Turtle, *Trionyx* spp.	-	-	-	-	-	32	-	-
Turtle, spp.	69	35	-	34	155	793	90	9
Lizard: Lacertilia	-	-	-	-	1	-	-	-
Snake: Colubridae	-	-	-	3	18	314	9	1
Snake: Crotalidae	-	-	-	-	2	26	5	-
Snake, spp.	19	23	-	4	81	1,437	37	9
Amphibians								
Hellbender, *Cryptobranchus alleganiensis*	-	-	-	-	17	75	2	-
Salamander, sp.	1	-	-	-	-	-	-	-
Eastern Spadefoot Toad, *Scaphiopus holbrooki*	1	-	-	-	9	122	-	-
Toad, *Bufo* spp.	-	-	-	-	37	32	-	1
Toad, *Scaphiopus*/*Bufo* spp.	-	-	-	-	-	100	-	1
Bullfrog, *Rana catesbeiana*	-	-	-	-	1	-	-	-
Frog, *Rana* spp.	-	-	-	-	13	58	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Toad/Frog spp.	2	2	-	-	27	164	2	-
Fish								
Gar, *Lepisosteus* spp.	-	1	-	-	1	9	1	-
Pike, *Esox* spp.	-	-	-	-	-	2	-	-
Common Stoneroller, *Campostoma anomalum*	-	-	-	-	1	6	-	-
Minnow, cf. *Phenacobius* sp.	-	-	-	-	-	1	-	-
Creek Chub, *Semotilus atromaculatus*	-	-	-	-	1	3	-	-
Creek Chub/Shiner, *Semotilus atromaculatus*/ *Notropis* spp.	-	-	-	-	-	3	-	-
Chub, *Nocomis* spp.	-	-	-	-	2	15	-	-
Chub, cf. *Nocomis* sp.	-	-	-	-	-	1	-	-
Shiner, *Notropis* spp.	-	-	-	-	1	6	-	-
Minnow spp., Cyprinidae	-	-	-	2	5	19	1	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Buffalo, *Ictiobus* spp.	-	-	-	-	2	4	-	-
Northern Hogsucker, *Hypentelium nigracans*	-	-	-	-	3	2	1	-
River Redhorse, *Moxostoma carinatum*	-	-	-	-	1	-	-	-
Redhorse, *Moxostoma* spp.	1	-	-	-	8	74	4	1
Sucker spp., Catostomidae	1	-	-	-	25	221	11	-
Catfish, *Ictalurus* spp.	1	-	-	-	1	9	4	-
Catfish, cf. *Ictalurus* sp.	1	-	-	-	-	-	-	-
Madtom, *Noturus* sp.	-	-	-	-	-	-	2	-
Catfish spp., Ictaluridae	-	-	-	-	4	17	3	-
Bass, *Micropterus* spp.	-	-	-	-	-	5	2	-
Sunfish, *Lepomis* sp.	-	-	-	-	-	1	-	-
Sunfish spp., Centrarchidae	-	-	-	2	25	170	37	-
Walleye/Sauger, *Stizostedion* sp.	-	-	-	1	-	-	-	-

Table 31 (continued)

Species	40CF108	40CF111	40CF32	40BD46	40BD55	40FR7	40FR45	40CF214
Freshwater Drum, *Aplodinotus grunniens*	-	-	-	-	14	23	4	-

but some such as the Chickasaw considered them impure and taboo (Swanton 1946).

Opossums are omnivorous scavengers that prefer to live in open wooded areas near streams. They are most active at night; during the day they den in hollow trees, fallen logs, and rock cavities (Schwartz and Schwartz 1959). Ethnographic accounts note that some southeastern groups used dogs to capture opossums, but Swanton (1946) feels this was a historic phenomenon and not commonly used prior to European contact. Considering their nocturnal habits, the animals were more likely caught in snares or traps. Although opossums do not have a particularly fine fur, Grant (1925) states that some groups dyed the fur various colors and fashioned the hide into a hat.

Skeletal remains of the eastern mole were found at only two sites, a single element at 40CF108 and five elements from one individual at 40FR7. The eastern mole lives out almost its entire life in its subterranean burrows, only rarely venturing to the surface (Schwartz and Schwartz 1959). Due to its reclusive nature and burrowing habits, the mole has traditionally been considered a natural inclusion at sites where its remains are recovered. This view was challenged, however, when Parmalee (1975) found a mole radius with butchering cuts among the faunal remains of a Mississippian feature at 40CF111. None of the Owl Hollow mole remains were found to have butchering cuts and they are thought to be from animals that died naturally at the site. In one of the few ethnographic references to moles, Adair (1930) notes that many

southeastern Indian groups feared their children would go blind if they touched these creatures.

The remains of two species of shrews, the least shrew and the short-tailed shrew, were found in the 40FR7 faunal sample. The two skeletal elements from the least shrew represent only a single individual while the four elements from the short-tailed shrew are from a minimum of three individuals. Least shrews are most commonly found in open grassy areas or in brush, occurring much less frequently in marshy or timbered habitats. Contrastingly, the short-tailed shrew is generally found in damp or wet undergrowth in wooded areas or in fields covered with heavy weedy plants (Schwartz and Schwartz 1959). Both shrew species are believed to be natural occurrences at the site. No ethnographic references concerning Indian use of shrews could be found.

Skeletal remains of the raccoon were found at four of the Owl Hollow sites, three elements from one individual at 40CF111, one element from 40BD46, seven elements from at least two individuals at 40BD55, and 61 elements from at least six individuals at 40FR7. Raccoons most generally den in hardwood forests near a source of water. They are omnivorous animals that feed primarily at night. The raccoon appears to have been used with some consistency by the Owl Hollow peoples. Because of its high meat yield per animal it would have been an important dietary supplement; this is most evident at 40FR7 where the six individuals in the sample could have added approximately 105 pounds of meat to the diet.

Swanton (1946), in his study of southeastern Indians, notes that the raccoon was also highly regarded for its fur which was made into clothing and pouches. Its claws were sometimes used as ear lobe ornaments. Historic Indians used dogs to run down raccoons, but Swanton (1946) suggests that this may not have been a pre-Columbian practice. Because of their nocturnal habits raccoons would have been most easily and economically captured with traps, snares, or deadfalls. One author (Hamblin 1973) has even suggested that they may have been pulled by hand from their dens, but this would seem a rather risky venture. Raccoons should have been an abundantly available resource in the upper Duck and Elk river valleys.

Long-tailed weasel remains were found only at 40FR7 and consisted of five elements from one individual. Schwartz and Schwartz (1959) record that long-tailed weasels generally locate their burrows near a permanent water source preferably in woodlands, thickets or brushy fence rows. This small animal is an extremely aggressive carnivore that nightly canvasses a portion of its 400 acre range in search of prey. While the weasel could have been used as an occasional food source, its pelt was likely its most desirable attribute. Swanton (1946) states that the Spanish chroniclers commented on the natives having cloaks and robes made from the musky smelling skins of marten or sable. Historically the marten has a more northern distribution and the sable is a Eurasian animal, however, the pelts of their North American relatives the weasel, mink, or otter could have been used in the manufacture of these garments. The weasel was probably captured in a trap or snare.

Remains of the mink were also found only at 40FR7, these consisted of three elements from at least one individual. A prerequisite for mink is the presence of a permanent water source. They make their homes in burrows or hollow trees along the banks of streams and rivers or shorelines of lakes and marshes (Schwartz and Schwartz 1959). Mink are entirely carnivorous animals that hunt largely at night for their prey, a mixture of both aquatic and land dwelling species. As with its close relative, the weasel, the mink may have been desired more for its fine winter pelt than as a meat resource. Owl Hollow peoples most likely trapped the mink near its burrow, probably on Town Creek, along the Elk River, or in nearby Mingo Swamp.

Only a single otter element was identified from the Owl Hollow sites, this at 40FR7. Otter habitat consists of streams, rivers and lakes, generally bordered with timber. They make their homes in burrows along the banks of these water sources. Numerous aquatic vertebrate and invertebrate species make up the otter's food; they hunt principally at night. Otters have a very large home range, between 50 to 100 miles of shoreline, and are never very numerous in any one location (Schwartz and Schwartz 1959). This may account, in part, for their paucity in archeological faunal samples. While the otter could have been used as a meat resource, its pelt may have been its most desirable attribute. Otter pelts could have been used in the manufacture of the cloaks and robes described by Swanton (1946). Owl Hollow Indians probably trapped the otter near its burrow.

Striped skunk skeletal remains were identified at four sites, one each from 40BD46 and 40BD55, 23 from at least two individuals at 40FR7, and two from a single individual at 40FR45. A single probable striped skunk element was found at 40BD55. The striped skunk is an animal characteristically found in open mixed woods, brushland, and open prairie (Burt and Grossenheider 1976). They are nocturnal and omnivorous in their food habits. Schwartz and Schwartz (1959) hypothesize that skunks may have historically increased in numbers since more land has been cleared of forest cover. Ethnographic records note the use of skunk meat as a dietary supplement, but no mention could be found of its hide being used for any purpose (Swanton 1946). An additional use for the animal was noted by Mooney (1900), who states that the Cherokee used skunk scent glands to ward off contagious disease. The scent gland was placed above a house doorway and punctured slightly, the resultant fumes were believed to prevent the entry of diseases into the home. Skunks may have been taken with deadfalls or snares.

Ten skeletal elements from at least three gray foxes were found at 40FR7, and a single probable gray fox element was found at 40BD55. Also, 10 elements which could be identified only as being from a fox (red or gray) were recovered from 40FR7. The gray fox is documented as occurring most frequently in open forest and brushland. While primarily nocturnal this fox can occasionally be found abroad in the daytime. It is almost entirely carnivorous and is a solitary hunter of small game. Gray foxes appear to have been taken fairly

frequently, at least at 40FR7. They were probably a welcome dietary supplement and their pelts may also have served a number of functions. Swanton (1946) notes that fox hide was used to make pouches and bowman's wrist guards. No ethnographic accounts could be found describing the capture of foxes, but snares and deadfalls may have been used.

Remains of the domestic dog were found at three Owl Hollow sites, a single element at 40BD46, two elements from one individual at 40BD55, and 181 elements from at least four individuals at 40FR7. Also at 40FR7 were five probable domestic dog elements. Many of the dog bones at 40FR7 were from a single, badly fragmented individual. No size measurements were attempted from the broken remains, but they are believed to be from animals of only moderate size. That dogs were at least sometimes used as meat resources was confirmed at 40FR7 by a femur with heavy butchering cuts. Historic records indicate that dogs were common and generally had the run of the camp. Swanton (1946) comments that dogs were historically used to run down game, and were themselves consumed as food items at social or ceremonial feasts.

Only one cougar skeletal element was found at the eight Owl Hollow sites being studied here; this bone was from 40FR7. This large solitary cat was formerly found over a majority of the United States. It will establish itself in almost any wilderness area that has an abundant supply of deer, its principal prey species (Whitaker 1980). Swanton (1946) records a number of southeastern Indian groups

as eating cougars, but Adair (1930) states that some tribes considered all carnivorous animals to be unclean and polluted food. Whether or not it was used as food, most groups considered slaying a cougar an act of bravery because of its large size and ferocity (Swanton 1946). Its skin was used for robes or in at least one case for making a quiver (Swanton 1946; Adair 1930). Cougars are abroad either day or night and could have been purposely hunted or accidently encountered by a hunter after other game.

Woodchuck skeletal remains were excavated from four of the Owl Hollow sites, one from 40CF108, two each from single individuals at 40BD46 and 40BD55, and 27 elements from at least two animals at 40FR7. The woodchuck is a relatively large, burrowing rodent that prefers to live in tree lines near open grassy clearings where it feeds (Schwartz and Schwartz 1959). Woodchucks hibernate during the winter and thus are available for exploitation only during the warm weather months of the year. Schwartz and Schwartz (1959) believe that the woodchuck was not as common prehistorically as it is at present since less land was open and suitable for its habitation. With the exception of 40FR7, the general paucity of woodchuck bones at most Middle and south central Tennessee sites would tend to support this contention (Robison 1978). The Owl Hollow type site was near the flat Highland Rim, which may have been only intermittently forested and thus may have supported a larger population of woodchucks. No ethnographic references could be found on how southeastern Indians captured or utilized woodchucks. They were,

however, probably trapped or snared near their dens, and because of their high meat yield per animal they were undoubtedly a welcome addition to the diet.

Skeletal remains of the eastern chipmunk were found at three of the study sites, a single element from 40CF111, 14 elements from a single individual at 40BD46, and 15 elements from at least two individuals at 40FR7. It should be noted that all 14 elements at 40BD46 were grouped together and obviously were those of a single animal that had died naturally in its burrow. The eastern chipmunk generally prefers to live in open woodlands or on forest edges, where it constructs its burrow in wooded banks or under logs and stone piles (Schwartz and Schwartz 1959). During the warm weather months they are active during the day and spend most of their time gathering food, primarily seeds, nuts, and some insects. No ethnographic references could be found regarding Indian use of the chipmunk.

Squirrel skeletal remains were found at six of the eight Owl Hollow sites examined for this study. The gray squirrel and the fox squirrel both occur in the study area. Based upon fragmentary skeletal remains it is difficult to differentiate the two species so most of the squirrel remains have been recorded as being from gray/fox squirrels (3 elements from a single individual at 40CF111, 5 elements from a single animal at 40BD46, 28 elements from at least three individuals at 40BD55, 255 elements from at least 15 different animals at 40FR7, 5 elements from one animal at 40FR45, and 2 elements from one individual at 40CF214). One element at 40FR7 could

be specifically identified as being from a gray squirrel, while one element at 40BD55 and four elements at 40FR7 were from fox squirrels. An additional five elements from 40BD55 were most probably from a fox squirrel.

Gray squirrels and fox squirrels subsist on nearly identical diets made up in part of nuts, wild fruits, berries, tree bark, and occasional insects. They tend also to prefer similar habitats, generally a mixed hardwood forest with oak and hickory trees predominating. Fox squirrels, however, are generally found in their greatest numbers along higher ridges, while gray squirrels are more concentrated in the bottomlands along streams (Schwartz and Schwartz 1959). Southeastern Indians made extensive use of squirrels. They were a favorite food and their skins were sometimes fashioned into clothing. Their claws were used as ear ornaments and their skins were reportedly made into bow strings (Swanton 1946). Young boys have been recorded as hunting squirrels with blowguns and bows and arrows, but they may also have been taken with snares and traps (Swanton 1946). Ethnographic accounts note that some Indian groups merely singed the hair off of squirrels before cooking them, they were not skinned or gutted prior to consumption (Swanton 1946). Squirrels, based upon their wide distribution (six of the eight sites) and frequent occurrence in the faunal samples, can probably be considered a preferred food of the Owl Hollow peoples.

Beaver remains were found at three sites, two elements each from single individuals at 40BD46 and 40BD55, and five pieces from one

individual at 40FR7. The beaver is a semi-aquatic animal that was distributed over much of North America during the early historic period. They feed primarily on bark from trees that they cut down at night. Beavers have been known to go up to 600 ft from the water's edge to obtain food and cut trees, but they generally remain much closer to water. Indians caught these animals by setting snares near their dams and lodges (Swanton 1946). Beavers were desired by Indians for their meat, pelts, and incisor teeth which could be fashioned into chisels. Two worked beaver incisors were found at 40BD55. Only the Chickasaw are noted as tabooing the beaver as a polluted food source (Adair 1930). Although it does not appear to have been taken with any regularity by the Owl Hollow peoples, the beaver with its large meat yield per individual should have been a welcome supplement to the diet.

Small rodent remains (primarily from the family Cricetidae) make up a large portion of the mammal assemblage associated with the Owl Hollow sites. A majority of the small rodents identified from these remains are believed to be natural inclusions in the archeological deposits. These animals include the white-footed/deer mouse, eastern woodrat, rice rat, hispid cotton rat, southern bog lemming, pine vole, and the meadow jumping mouse. Then, as now, some of these small rodents would have been attracted to the camps by man's food stores and his garbage. No ethnographic accounts could be found regarding Indian use of small mice and rats. However, the use of these small rodents as dietary items cannot be completely written

off. Parmalee (Watson 1969) examined the animal bone found in human coprolites from Salts Cave and found a large portion of the sample to be from small rodents, particularly those from the genera Peromyscus and Microtus.

Confusing results were obtained in the individual site descriptions when an attempt was made to use the rodent species at each site to determine local environmental conditions. Since many rodent species are quite specific about the types of environments they generally inhabit it was hoped that they might serve as good indicators of local conditions for the archeological site at which they were discovered. Problems arose, however, when species that usually preferred quite different habitats were found in relatively large numbers at a given site. For example, at 40FR7 the remains of the rice rat, the pine vole, and one or more species of Peromyscus were quite numerous. The rice rat is generally found in marshes and wet meadows, and less frequently on dry upland slopes with tall grass, weeds or brush cover (Schwartz and Schwartz 1959). The pine vole, on the other hand, prefers oak-hickory or mixed hardwood forests, or fields adjacent to timber provided there is enough ground litter for cover (Schwartz and Schwartz 1959). The four species of Peromyscus found in the project area (P. maniculatus, P. leucopus, P. gossypinus and P. nuttalli) generally occupy wooded habitats (Burt and Grossenheider 1976). The wood rat, which was represented at the site by a single skeletal element, is also a woodland species. Three of the small rodent species found at 40FR7 are most common to

hardwood forests, thus suggesting that the site was placed within such a setting. The occurrence of the rice rat in such a habitat would be anomalous since it prefers open, wet environments. Two explanations may be advanced to explain this situation: 1) the rice rats were, in fact, considered a food resource and were brought into camp after their capture; or 2) the camp, with its food stores and garbage, drew in the rice rats from their nearby preferred habitat. No butchering cuts were found on any rice rat remains so it cannot be proven whether they were food items or just attracted to the site from a nearby wet, grassy area.

While most of the small rodent species found at the eight Owl Hollow sites are common to Middle Tennessee today, the southern bog lemming is the exception. Hall (1981) feels that the modern distribution of the southern bog lemming in Tennessee is limited approximately to the Great Smokey Mountains in the easternmost portion of the state. Prehistorically the southern bog lemming had a more expanded range in Tennessee. Two elements from single individuals were found at both 40CF111 and 40BD55. Additional Middle Tennessee finds of the southern bog lemming were made in the Pleistocene and Holocene deposits at Cheek Bend Cave (40MU261), Maury County, (Klippel and Parmalee 1982) and at the Averbuch site (40DV60), a Mississippian Indian village occupied between approximately A.D. 1200-1400 in Davidson County (Romanoski 1984). Southern bog lemmings are generally found in thick stands of grass in low, moist areas or in swamps, bogs, and damp woods having an

accumulation of leaf mold (Schwartz and Schwartz 1959). They are most active in the afternoon and at night.

Muskrat remains were found only at 40FR7, and consisted of four skeletal elements from at least one individual. The muskrat is an aquatic rodent that is commonly found over much of the United States in rivers, creeks, ponds and lakes. For living quarters they construct either bank dens or lodges of aquatic vegetation built in shallow water. Generally, the muskrat is a nocturnal feeder (Whitaker 1980). Ethnographic references to Indian use of the muskrat are vague, but Swanton (1946) believes that they may have been consumed by the Indians in Florida. Muskrat fur may have been used for clothing (Swanton 1946). Traps or snares were probably set near the dens or runways of these animals to capture them. Although the muskrat should have been fairly common in the study area, its paucity in the faunal samples does not suggest that the Owl Hollow peoples put any great reliance on it as a food or fur resource.

The single porcupine element recovered at 40FR7 was the only evidence of this animal to be found at any of the Owl Hollow sites. Historically porcupines were extirpated in Tennessee, and their remains have been found only infrequently in bone samples from prehistoric sites. Porcupines are solitary vegetarians that generally feed at night. They prefer to live in forested or brushy areas (Whitaker 1980). Western Indian groups used the porcupine as a food resource and dyed its quills to sew on clothing and accouterments for decoration. Prehistoric groups in Tennessee

probably used the porcupine in much the same way until its extirpation. Whether it died out in Tennessee from overexploitation by man or from natural causes is unknown.

Rabbit skeletal elements, which were found at six of the sites, were some of the most common mammal remains recovered at the Owl Hollow sites. Two elements from a single individual were found at 40CF108, 3 elements from one animal at 40CF111, 63 bone fragments from at least two animals at 40BD55, 149 skeletal remains from at least eight individuals at 40FR7, 14 elements from two animals at 40FR45, and 7 elements from a single rabbit at 40CF214. Two species of rabbit may potentially occur within the study areas, the cottontail (Sylvilagus floridanus) and the swamp rabbit (Sylvilagus aquaticus). While the cottontail is the most common species in the region, the range of the swamp rabbit approaches the study areas (Schwartz and Schwartz 1959). On the whole, the swamp rabbit is slightly larger and heavier than the cottontail, but enough overlap in size range exists to make the two species extremely difficult to separate osteologically when working with fragmented archeological material. Although the majority of the rabbit material compares very favorably with cottontail skeletons, the possible presence of swamp rabbit remains in the sample has necessitated listing it as Sylvilagus cf. floridanus. Cottontails are generally found in heavy brush, strips of forest with nearby open areas, weed patches, and the edges of swamps. Swamps, marshes, and wet bottomlands make up the habitat of the swamp rabbit. Both feed on nearly the same foods,

green vegetation in the summer and bark and twigs in the winter (Burt and Grossenheider 1976).

Rabbits were eaten by nearly all southeastern Indian groups. Swanton (1946) mentions that some Indian groups prepared rabbits for consumption by boiling them whole in pots without first skinning or gutting them. They may also have been roasted. Their skins were sewn together to make various sorts of clothing and cloaks (Swanton 1946). Historically snares and traps were commonly used to capture rabbits. Swanton (1946) quotes Elvas as stating that rabbits were often snared in the Indian corn fields, especially during the winter. Based upon their frequent representation in the faunal samples, rabbits are thought to have been a much used meat supplement for the Owl Hollow peoples.

Two probable elk antler fragments, from a single individual, were found at 40FR45. These antler fragments are the only evidence of elk from any of the Owl Hollow sites. It is unknown whether they were from shed antlers or taken from a hunted animal. Little is known about the elk in Tennessee since it was quickly extirpated during the early historic period. Elk habitat includes semi-open forest, mountain meadows, foothills, plains, and valleys. They feed on grasses, herbs, twigs, and bark (Burt and Grossenheider 1976). The nearby "Barrens" region would have been a very favorable habitat for the elk. The ranges of the elk and the white-tailed deer in the eastern United States apparently overlapped, but the elk seems not to have been as abundant as the deer.

Ethnographic accounts mention that the Choctaw, Creeks, and Chickasaw hunted elk. These records note also that southeastern Indians used elk hides as bedding (Adair 1930). Because of its size the elk would have been a very desirable meat resource. It is, in fact, surprising that more elk remains are not found at Tennessee archeological sites considering the animal's large meat yield. Two explanations may be advanced to explain this situation: 1) elk were never very numerous and therefore seldom taken or 2) most of their heavy skeletal elements were left at the kill site and only the usable meat and hide was returned to the Indian camp. This latter explanation is commonly referred to as the "schlepp effect" (Daly 1969). Unfortunately neither of these explanations can presently have its veracity confirmed.

The white-tailed deer is the only animal represented in all eight of the Owl Hollow faunal collections examined for this study. Fourteen skeletal elements from a single individual were recovered from 40CF108, 8 elements (and 6 probable white-tailed deer elements) from one individual were found in the 40CF111 materials, 5 elements from a minimum of two individuals were noted at 40CF32, 62 elements from at least four individuals were found at 40BD46, 59 elements from at least three individuals were recovered from 40BD55, 389 skeletal elements from at least nine individuals were found in the 40FR7 faunal sample, 75 elements from at least three individuals were present at 40FR45, and 20 elements from at least three individuals were recovered at 40CF214. The white-tailed deer was the greatest

contributor of meat to the Owl Hollow diet at all the sites but 40FR45. At 40FR45 the single elk may have supplied 350 pounds of meat, while three deer are estimated to have yielded only 300 pounds. A majority of the indeterminate large mammal bone fragments at the eight sites are also probably from the white-tailed deer, but they are too fragmentary to identify specifically. Based upon the frequency with which its remains occurred in the faunal samples and the amount of meat it contributed to the diet, the white-tailed deer was the principal game animal of the Owl Hollow peoples.

Odocoileus virginianus is found in nearly all of the lower 48 states. It is most common in open edge areas near forest or swamp habitats. It feeds upon twigs, shrubs, fungi, acorns, grass, and herbs as they become seasonally available (Burt and Grossenheider 1976).

The Owl Hollow peoples utilized the white-tailed deer as more than just a meat resource. Deer skeletal elements were frequently used to manufacture bone tools. Long bone splinters (most probably from metacarpals and metatarsals) were manufactured into needles and splinter awls, the distal ends of ulnae shafts were sharpened for use as awls, antlers were fashioned into tool handles and were probably used as tools for working chert, and deer phalanges were hollowed out and used as cups for the cup and pin game. Numerous additional uses for the white-tailed deer undoubtedly existed for which there is no archeological evidence. Ethnographic accounts show that the deer was probably the single most important animal to the economy of most

eastern Indian groups. Swanton (1946: 249), in his study of southeastern Indians, gave a brief but thorough listing of the uses for deer.

> The most important animal was the deer, and deerhide probably formed the most important single material entering into native dress. One of the bones from a deer's foot was used to remove the hair from skins. The head and neighboring parts were turned into a decoy for stalking other members of the deer tribe. The ribs were made into bracelets, part of the horn mounted on a club, and tips of the horns formed one of the commonest types of arrow points. The heads of drums were usually made by stretching a deer skin over a pot, keg, or cypress knee. Balls used in the great southern ball game were covered with deer hide, and the rattles which women wore about their ankles in dances were sometimes made of the hoofs of deer. Flutes or flageolets were sometimes made of the deer's tibia. The sinews, skin, or entrails were employed as thread or string, and bowstrings, fish nets, and the cords to fasten ballsticks together were constructed by their means. According to Strachey, bows were scraped by the use of a twisted deer hide. Parts of the horns and bones were made into needles, and the brains were employed in tanning skins. Ornaments were made from the horn, deer bones were worn stuck through the hair in Florida, and toward the north stained deer's hair was metamorphosed into crests for warriors. Deer horn was also boiled to make glue, and glue was extracted from deerskins to dilute coloring matter.

Indians in the Southeast most often stalked deer singly or surrounded them in cooperative hunts. The stalking hunting method generally consisted of a lone hunter creeping silently toward the deer, often using a deer head or skin as a decoy, to get close enough to shoot the animal (Swanton 1946). When hunting deer cooperatively, a surround method was generally employed. In the surround method a number of hunters would set fire to the woods and drive the game towards a stream; a second group of hunters waited at the stream to shoot the deer and possibly other animals as they fled the fire and attempted to enter the water.

The extremely fragmented condition of most the Owl Hollow faunal remains makes it difficult to comment on the age and sex composition of the deer populations which were exploited. Deer mandibles are some of the most reliable age indicators, especially for animals under two years old. The four mandibles complete enough to be aged were from 40FR7; all were from adults over two years old. Two of the mandibles were from a single individual approximately 4 1/2 years old; the other mandibles were from two different animals, each approximately 3 1/2 years old. Isolated deciduous teeth and bones from immature animals were found at most of the eight sites, as were extremely worn teeth from older individuals. The Owl Hollow hunters were undoubtedly opportunistic and killed any deer they could regardless of its age. Deer can be hunted in any season, but bucks are more easily taken in the autumn when they are in rut. At this time they range more widely and can be more easily attracted to the hunter.

White-tailed deer bucks develop and lose their antlers on a regular seasonal schedule, often making it possible to speculate on when they were taken by hunters. Growth of antlers annually begins in April or May and is generally completed sometime in August or September. The antlers are shed after the end of the rut, between the end of December to mid-February (Schwartz and Schwartz 1959). If the animal was killed during the early months of antler development, between May and July, the antler is rather soft and is less likely to be preserved in archeological context. Antler becomes hard and

compact and the velvet is shed during the months of August and September. Bucks taken between August and February will have their antlers attached to the animal's frontal bone. White-tailed deer frontal bones with antler pedicels were found at 40FR7 (two examples) and 40BD55 (one example). In each case the antlers had been shed, showing that the animals had been taken sometime between antler loss in December and the hardening of the new antlers in July. The base of a shed antler was found at 40FR7. Shed antlers are quickly eaten by rodents for their mineral content so it is likely that the antler was picked up by the site inhabitants shortly after its loss in December to mid-February (Calhoun and Loomis 1975).

The complete absence of black bear remains in the Owl Hollow faunal samples is of extreme interest. Historically southeastern Indians relied heavily on the bear for its fat, meat, and fur (Swanton 1946). It is difficult to believe that bears were not taken on occasion by the Owl Hollow peoples. Bear skeletal remains were probably ceremonially disposed of off site, in a place where they would be safe from scavenging. Ceremonialism of this sort was quite common historically among Algonquin groups (Hallowell 1926).

Aves

The remains of 12 species of birds were recovered from the Owl Hollow sites examined for this study. Birds, however, appear to have played only a very minor role in the Owl Hollow diet. The turkey was the only bird species to be represented at more than two of the Owl Hollow sites. Hawk and bobwhite quail remains were found at two

sites each, but all the other species were found only at 40FR7. Passerine bird remains were identified at three sites, but they were from more than one species. The majority of the identifiable bird remains were recovered from 40FR7; 68 elements from at least 12 species were found there. Bird egg shell remains were found at three sites, 40BD55, 40FR7, and 40FR45. Egg shell is rarely reported from archeological sites and its recovery helps give a more complete picture of the Owl Hollow diet. Swanton (1946) states that bird eggs were eaten everywhere in the Southeast, and were specifically mentioned as food items in ethnographic accounts of the Choctaw, Chickasaw, and Powhatan. He does not mention how they were prepared for consumption. Most bird species lay their eggs in the spring, but some species will lay a second clutch latter in the summer. Eggs, then, would have been a dietary item in the spring or early summer.

Only six waterfowl skeletal elements were recovered from the eight Owl Hollow sites, all from 40FR7. Five of the elements were from a single Canada goose and one element was from an indeterminate species of duck. The upper Elk and Duck rivers are not on a major waterfowl migration corridor (Bellrose 1976), so the paucity of waterfowl in the faunal samples was not surprising. Waterfowl were probably a welcome addition to the Owl Hollow diet when taken, but they were evidently not numerous enough at any time of the year to be more than infrequent supplements.

Three hawk skeletal remains were found at 40FR7, and a single element was found at 40FR45. Two of the 40FR7 elements were probably

from a species of Buteo hawk while the other fragment was from an indeterminate species, but one comparable in size to a sharp-shinned or Cooper's hawk. The 40FR45 specimen was from an indeterminate species of small hawk. Adair (1930) notes that some southeastern groups considered birds of prey to be polluted and would not eat their flesh. They did, however, use eagle and hawk feathers as ornaments and the wings as fans; talons were fastened to the breechclout as a decoration (Swanton 1946). Sometimes hawk skins were tied to the hair for decoration. They may also have been used as part of medicine bundles such as those employed by Plains Indian groups (Parmalee 1977).

Skeletal elements of gallinaceous birds, especially the turkey, made up a majority of the Owl Hollow bird remains. A single fragmentary bone from a grouse, most probably a ruffed grouse, was found at 40FR7. The ruffed grouse is most commonly found in semi-open wooded areas where it generally feeds on seeds, berries, ground dwelling insects, and occasionally small vertebrates (Bent 1932). During the summer the ruffed grouse is rather solitary in nature, but in winter several birds may flock together (Terres 1980). At present the ruffed grouse is only found in the mountainous portions of East Tennessee, but based upon the findings of Klippel and Parmalee (1982) at Cheek Bend Cave, this species formerly occurred in the central portion of the state.

Remains of the bobwhite quail were found at two sites, three elements from a single individual at 40BD55 and eight elements from

at least two individuals at 40FR7. The bobwhite most often inhabits brush, abandoned fields, and open pinelands, generally avoiding deep forests (Robbins et al. 1983). The majority of its food consists of seeds, fruits, and insects (Bent 1932). As with other gallinaceous birds, the bobwhite has a high meat yield per animal. It is rather surprising that the bobwhite was not more widely used by the Owl Hollow Indians.

Turkey remains were found at five of the Owl Hollow sites. There were 5 turkey elements recovered from 40BD46, 11 from 40BD55, 34 from 40FR7, 14 from 40FR45, and 1 from 40CF214. With the exceptions of 40FR7 and 40CF214, there were at least two individuals represented at each site. There were at least six individuals in the 40FR7 sample, and only one at 40CF214. Turkey habitat requirements are similar to those for the bobwhite, with each species most frequently found in open woodlands or forest clearings. Their preferred foods are seeds, fruits, and insects. Turkeys often travel in flocks, generally segregated by sex except during the breeding season (Terres 1980). Prehistorically, Shorger (1966) estimates that there may have been an average of eight turkeys per square mile in Tennessee. He admits, though, that this estimate is conservative, and that some areas may have supported larger populations.

Because of their population densities, year round availability, and high meat yield per individual, turkeys were a favorite meat resource of the Owl Hollow peoples and were abundantly represented in the faunal collections. Turkeys were, however, utilized as more than

a meat resource. Five tarsometatarsi awls were recovered from 40FR7, three were definitely manufactured from turkey elements and two were most probably from the turkey. To make these awls the trochlea had been removed and the distal ends of the shafts had been ground to a point. Historically southeastern Indians made extensive use of turkey feathers in making feather mantles and blankets. The wing and tail feathers were also used as fans (Swanton 1946).

Schorger (1966) describes a number of hunting methods used by historic Indians to obtain turkeys; these included circular hunts, snares, and driving the birds into trees. Turkey calls were often used to lure the birds close enough to shoot.

A radius shaft from the sandhill crane was found at 40FR7. In the past, the sandhill crane almost certainly migrated through the state and sedentary populations may even have nested in favorable portions of Middle Tennessee. Sandhill cranes generally inhabit shallow water ponds, marshes, and sloughs where they feed on seeds, berries, and small animals and insects (Terres 1980). The sandhill crane is a large bird and would have made an excellent supplemental meat resource; however, the paucity of its remains in the faunal samples suggests that it was either not abundant in the project areas or at least not sought after on a regular basis. Owl Hollow Indians may also have desired the crane for its plummage. Wissler (1912) mentions that the head of a crane made up part of a Blackfoot medicine-pipe bundle.

Only a single passenger pigeon element, a scapula from 40FR7,

was identified from the materials at the eight sites examined. Historically the passenger pigeon was found in North America in overwhelming numbers. Great flocks migrated between their nesting sites in the northern United States and Canada to their wintering grounds in the southeastern United States (Schorger 1955). Their exact migration corridors and wintering stops are not known, but Ganier (1933) suggests that they may have wintered in Tennessee. If this is so, few roosts must have been situated in Middle Tennessee, since passenger pigeon remains are very sparse in archeological collections from this region. Historic southeastern Indian populations generally exploited the passenger pigeon in great numbers when it was locally available (Swanton 1946).

The mourning dove was represented at only one site, 40FR7, by a single tarsometatarsus. Mourning doves are commonly found in open country edged by trees and brush. Today they are frequent over the state, but prehistorically they may not have been as numerous before the forests were cleared.

Three owl skeletal elements were found at 40FR7. Two (an ulna and a phalanx 1) were from a single screech owl and one (an ungual phalanx) was from an indeterminate species of small owl, a bird in the size range of the screech or the saw-whet owl (Aegolius acadicus). The screech owl is common to woodlands and is a nocturnal raptor that feeds largely on mice, shrews, birds, and insects (Bent 1938). Owls could have been used as a food resource, but Adair (1930) states that many southeastern groups considered owls to be

unclean and inedible. Swanton (1946) notes that Creek medicine men carried an owl skin as a symbol of their calling.

A common crow tarsometatarsus from 40FR7 was the only specifically identifiable passerine bird bone to be found at any of the Owl Hollow sites. Crows are common birds that occur over much of the United States. They feed generally on seeds, insects, and small animals, and will scavenge larger animals and fish when they are found dead (Terres 1980). The crow at 40FR7 could have been a food item, but many southeastern Indian groups considered the crow to be an unclean animal and would not eat it (Adair 1930). Perhaps a crow skin or parts of its body were used as decorative items or were part of a medicine bundle.

Indeterminate passerine bird remains were found at three sites, one and three elements respectively from single individuals at 40CF108 and 40BD55, and nine elements from at least two individuals at 40FR7. Most of the passerine remains were quite fragmented and none could be specifically identified. Birds belonging to the order Passeriformes, the perching birds, are some of the most common species in North America and are found in diverse habitats. Many of the species are rather small and could have contributed little meat to the diet. Some, however, have very bright, beautiful plumage and their feathers may have been used as personal decorative items. Swanton (1946) notes the use of redbird (cardinal?) wings in a headdress.

Reptilia

Reptile remains were found at all eight sites and in most cases made up a large portion of the identifiable faunal remains. Reptiles were not, however, a major meat resource. MNI counts were rather low for each species and the amount of meat each could have contributed to the diet was minor. This is not to disparage reptiles as a food resource, as they were most likely welcome supplements to the diet.

There were two basic categories of reptile remains found at the Owl Hollow sites, turtles and snakes. Since reptiles are cold blooded animals they would have been available only on a seasonal basis. The box turtle and the various snakes found in the project areas would have been most sensitive to temperature changes and would have been found only during the warmer seasons of the year, late spring, summer and early autumn. Aquatic turtles would have been unavailable only during the coldest portions of the winter when low water temperatures would force them to burrow in the mud to hibernate. Active specimens of Chrysemys have been netted by the author from the Clinch River in freezing January weather. Ernst and Barbour (1972) note also that snapping turtles have been seen crawling under the ice in midwinter. Aquatic turtles are very quick to flee when approached while sunning, so they were most likely captured in fish nets or traps while in the water. It is also possible to collect the females when they come on land to lay eggs. Snakes and box turtles could have been picked up by men or women when encountered during trips outside the village.

Snapping turtle remains were found at four of the Owl Hollow sites, two elements each at 40CF108 and 40FR7 and single elements from 40CF111 and 40BD46. No more than one animal was thought to be represented at any of the sites. The snapping turtle is distributed throughout most Tennessee streams and ponds. They are carnivorous animals that feed primarily at night. During the day they generally are quite sluggish and float just beneath the water with only their eyes and nostrils protruding (Ernst and Barbour 1972). Mount (1975) states that they generally leave the water only to lay eggs. The snapping turtle is fairly consistently represented at the Owl Hollow sites and was probably a desired supplement to the diet to be taken whenever the opportunity arose.

Skeletal remains of turtles belonging to the family Kinosternidae were quite common in the faunal samples; they were absent only from 40CF32 and 40BD46. Three species of kinosternid turtles are expected to occur on the upper Elk and Duck rivers, these are the stinkpot (Sternotherus odoratus), the musk turtle (Sternotherus minor) and the mud turtle (Kinosternon subrubrum). The stinkpot was represented by five and eight elements respectively at sites 40FR7 and 40FR45; there were at least two individuals of this species present at each site. Three and four probable stinkpot elements, each from single individuals, were found at sites 40CF108 and 40CF111. Eight elements from at least three individuals of the mud turtle were found at 40FR7. Most common were the fragmented remains which could be identified only as being from a representative

of the family Kinosternidae. Ten such elements were found at 40BD55, 271 at 40FR7, four at 40FR45 and one at 40CF214. There was a minimum of six individuals of kinosternids at 40FR7; the samples from the other three sites produced only single individuals.

All three of these kinosternid turtles are strongly aquatic species that prefer to live in water with a slow current and soft bottom. River backwaters, sloughs, oxbows, swamps, and ponds are common habitats for these species (Ernst and Barbour 1972). The basking habit is poorly developed and only the mud turtle seems to emerge from the water with any regularity (Ernst and Barbour 1972). Kinosternid turtles are active off and on throughout the day. The stinkpot, musk turtle, and mud turtle are all able to exude a potent musky secretion when they are irritated. This reaction, combined with their small size (adults of these species average only 4 1/2 inches in length), makes their frequent appearance in the Owl Hollow faunal collections rather surprising.

The most common turtle remains in the Owl Hollow faunal samples were from the eastern box turtle; they were absent only from 40CF108 and 40CF32. There were 11 box turtle remains found at 40CF111, 74 at 40BD46, 165 at 40BD55, 344 at 40FR7, 63 at 40FR45, and 10 at 40CF214. There was a minimum of five box turtles found at 40FR7, four at 40BD55, three each at 40BD46 and 40FR45, and one each at 40CF111 and 40CF214. Three probable box turtle remains were found at 40CF111. The box turtle is a strictly terrestrial animal that frequents open woodlands near water sources. Adults of both sexes are approximately

the same size. The box turtle may have been obtained by the Owl Hollow peoples as a meat resource, but Ernst and Barbour (1972) and Carr (1952) note that it's meat is sometimes unsafe to eat if the animal has been eating poisonous fungi. Box turtle shells are recorded ethnographically to have been used as dippers and sometimes as rattles (Swanton 1946). A portion of a worked box turtle carapace was found at 40FR7. The interior vertebrae and the shell margin had been ground smooth; this piece may have been part of a cup.

Skeletal elements from the genera Graptemys (the map and sawback turtles) and Chrysemys (the cooters, sliders, and painted turtles) were found at all Owl Hollow sites but 40CF111 and 40CF214. Two species of Graptemys and three species of Chrysemys are noted by Conant (1975) to occur within the general project areas and include G. geographica, G. pseudogeographica, C. scripta, C. concinna, and C. picta. The remains of these species are very difficult to specifically identify when fragmented, so a majority of them have been classified only as Graptemys/Chrysemys spp. Skeletal fragments placed in this category include 7 elements at 40CF32, 1 element at 40BD46, 21 elements at 40BD55, 12 elements at 40FR7 and 2 elements at 40FR45. There was a minimum of two individuals present in the 40BD55 sample, but only one at the other four sites. Only at 40CF108 could any of these turtle remains be more specifically identified; these include a carapace fragment from Graptemys geographica and another carapace fragment most probably from one of the map turtles.

Turtles from the genera Graptemys and Chrysemys are thoroughly

aquatic and emerge from the water only to lay eggs and to bask in the sun. These turtles vary greatly in size, both among species and between sexes. Generally the female is larger than the male. Of the five species occurring in the Owl Hollow study area, Chrysemys concinna is the largest with the adult female averaging 13 inches in length. Female specimens of Chrysemys picta on the other hand are the smallest with adults generally measuring only 5 1/2 inches in length (Conant 1975). Species of Chrysemys and Graptemys are found in most of the streams, lakes, oxbows, and permanent ponds of the eastern United States. Quiet, slower waters seem to be preferred. Their essential habitat requirements are numerous basking sites, abundant aquatic vegetation, and a soft substrate (Ernst and Barbour 1972). They are extremely wary while basking and rarely venture onto land except to lay eggs.

Softshell turtle remains were found only at 40FR7. Thirty-two elements from at least two individuals were recovered from this site. Two species of softshell turtles occur in the Duck and Elk rivers, the spiny softshell (Trionyx spinifer spinifer) and the smooth softshell (Trionyx muticus). Both species are found in a great range of habitats, including rivers, streams, lakes, ponds, and oxbows. Essential elements for their habitat include a soft substrate, some aquatic vegetation, and sandbars or mud flats for basking (Ernst and Barbour 1972). The softshell turtle spends more of its time buried in the substate than other aquatic turtle species; perhaps this made it more difficult to capture and accounts for its paucity in the Owl

Hollow faunal samples. The Trionyx materials found at 40FR7 were too fragmentary to identify to species. Softshell turtles would seem only to have been sporadic supplements to the diet.

An indeterminate lizard mandible fragment found in the 40BD55 faunal remains was the only one from the eight sites used for this study. In all probability the lizard was a natural inclusion at the site.

Snake remains were identified from seven of the Owl Hollow study sites, and were missing only from 40CF32. The snake skeletal elements consisted almost exclusively of ribs and vertebrae, with only a few very fragmented skull elements. It is nearly impossible to estimate minimum numbers of individuals for snakes when only ribs and vertebrae are found. Each snake will have large numbers of vertebrae and ribs of varying sizes depending on their position along the spine. Only at 40FR7, where there were 314 colubrid skeletal fragments, could more than one individual be recognized. There was a minimum of three colubrid snakes at 40FR7. Ribs can only rarely be used for identification, but vertebrae which are nearly complete can generally be classified as having come from either poisonous (family Crotalidae) or non-poisonous (family Colubridae) snakes.

Potentially there are 20 species of colubrid and three species of crotalid snakes present within the study areas. Three colubrid snake remains were found at 40BD46, 18 at 40BD55, 314 at 40FR7, 9 at 40FR45, and 1 at 40CF214. Crotalid snake remains were recovered from three sites, with 2 elements from 40BD55, 26 from 40FR7, and 5 from

40FR45. Only indeterminate snake remains were found at 40CF108 and 40CF111. Swanton (1946) states that a number of southeastern tribes ate snakes and used their skins as decorative items of dress. Timberlake (1927) was served rattlesnake on a number of occasions while residing with the Cherokee.

Amphibia

Amphibian remains were found at six of the eight Owl Hollow sites utilized for this study; they were missing only from 40CF32 and 40BD46. Generally, amphibian remains made up only a very small portion of each site's total skeletal sample. Most of the amphibian remains are believed to be from animals that were natural inclusions at each site. Amphibians played only a very minor part in the Owl Hollow subsistence system.

The hellbender is probably one of the few exceptions concerning the use of amphibians. Since it is a thoroughly aquatic animal, the remains of the hellbender could only have been present at the study sites through human intervention. There were 17 hellbender elements from two individuals found at 40BD55, 75 elements from four individuals at 40FR7, and 2 elements from two individuals at 40FR45. Hellbenders generally occur in fast running water of rivers and larger streams where they seek shelter beneath rocks, snags, and debris. They are carnivorous and have been recorded as eating crustaceans, mollusks, insects, and small fish (Smith 1961). Bishop (1941) noted that breeding aggregations of these creatures sometimes occur in August. No ethnographic references could be found regarding

Indian use of these animals as a food resource. However, considering the number of individuals found at each site and the impossibility of their being found there naturally, there can be little doubt that the hellbender was at least a minor supplement to the Owl Hollow diet. Most were probably taken in nets while fishing, but Smith (1961) notes that they will occasionally take a baited hook, especially in the spring.

The single salamander element found at 40CF108 is believed to have been a natural inclusion. No other salamander remains were recorded from the other sites. There are at least 17 species of salamander recorded as being present in the project areas (Appendix A).

Skeletal remains from the eastern spadefoot toad were found at three sites. A single element was found at 40CF108, 9 elements from two individuals from 40BD55, and 122 elements from eleven individuals from 40FR7. The spadefoot toad is not thought to have been used as a food resource. Those specimens found at 40CF108, 40BD55 and 40FR7 probably burrowed into the softer feature fill and were natural inclusions at the sites. Nearly entire skeletons of these animals were represented in the faunal samples. Conant (1975) notes that skin gland secretions from spadefoot toads cause many people to suffer severe allergic reactions, so this would act as an additional deterrent from eating these animals.

Toad remains from species of Bufo were recovered from three sites. Thirty-seven elements from at least four individuals were

found at 40BD55, 32 elements from at least six individuals were identified from the faunal materials at 40FR7, and a single element was noted at 40CF214. Bufonid toads would have occurred nearly anywhere in the project areas where there was some vegetation cover, a nearby water source and an abundant supply of insects (Conant 1975). It is highly doubtful that either of the Bufo species in the project area would have been used as food resources; these toads were in all likelihood intrusive into the site.

Only small numbers of ranid frog remains were identified from the Owl Hollow faunal samples. A single bullfrog skeletal element was identified from materials at 40BD55. Additional frog remains that could be recognized only as Rana species were found at 40BD55 and 40FR7. There were 13 elements from at least three individuals found at 40BD55 and 58 elements from at least four individuals in the 40FR7 faunal materials. Skeletal materials that were too fragmentary to identify specifically as being either toad or frog were found at 40CF108, 40CF111, 40BD55, 40FR7, and 40FR45.

While four species of ranid frogs are known to occur within the study areas (Appendix A), only the one bullfrog element could be specifically identified from the fragmentary osteological materials. Ranid frogs are found most abundantly in aquatic habitats, including rivers, streams, ponds, swamps, and oxbows. During certain times of the year, when conditions are moist and there is enough grass cover, they will wander from the banks of their usual aquatic habitat. It is unknown for certain whether frogs were taken as a food resource.

Today, frog legs are considered to be quite edible and this may also have been the case for the Owl Hollow peoples. Ethnographic data concerning the Indian utilization of frogs is quite scanty. The one reference that could be found noted that the Upper Cherokee were sometimes called "frogeaters" by the Lower Cherokee (Schwartz 1923). If frogs were consumed they would have been a very minor dietary supplement that could have been exploited only during the warm weather months of the year.

Osteichthyes

Recent collections have shown the Duck and Elk rivers to support abundant and varied fish populations (Nieland n.d.; Jandebeur 1972); prehistorically, when the streams were in a more pristine condition, fish may have been even more numerous. Fish bones were found at all eight of the sites utilized for this study. Only 40CF32 lacked identifiable fish remains. A minimum of 16 species of fish was represented in the Owl Hollow faunal samples. Site 40FR7, with 14 species, displayed the greatest diversity, but fish were also strongly represented in the faunal samples from 40BD55 and 40FR45 which possessed at least 11 and 7 species respectively. Fish remains were poorly represented at sites 40CF108, 40CF111, 40CF32, 40BD46, and 40CF214; there were no more than three fish species present at each site. Dry screening techniques, utilizing 1/4 in screen mesh, and hand sorting may account for a sampling bias at 40BD46 and 40CF214. Casteel (1972) has shown that most fish remains are lost when 1/4 in or larger screen mesh sizes are used. Nearly all faunal

remains are poorly preserved in the collections from 40CF108, 40CF111, and 40CF32, including the fish bones.

It is difficult to estimate the importance of fish to the Owl Hollow diet. While fish remains were found at each site, which would suggest that they were sought regularly as a food resource, it was impossible to estimate with any reasonable accuracy the amount of meat they would have contributed to the diet. Unlike mammals, fish grow throughout most of their lives and it is difficult to estimate an average adult weight. Recently, work has been done on regression formulas to calculate fish size and weight based upon the measurements of key skeletal elements from the study species. This information was not available during ongoing analysis of the Owl Hollow materials. Although it is recognized that the lack of fish meat weight estimates makes it difficult to calculate the importance of fish to the Owl Hollow diet, the task is not thought to be impossible. The significance of fish to the diet shall instead be estimated by the number of species identified at each site, the minimum number of individuals present and the total number of fish bones found at each.

The capture of fish may be accomplished by a number of methods. A worked bone fragment that was thought to be a partially completed fish hook was recovered from 40BD55, but no other evidence was found to suggest how the Owl Hollow peoples caught fish. The fishing methods used by historic Indian groups have been described in great detail by Erhard Rostlund (1952) in his study, "Freshwater Fish and

Fishing in Native North America." Some of these methods include nets (both large seines and smaller dip nets), fish weirs or traps, spears, hooks, gorges (used singly or on trot lines), and poisons. Several or all of these methods may have been used by the Owl Hollow peoples depending on the season of the year and the types of fish they were attempting to capture. For the sake of efficiency the method which yielded the greatest results in the shortest amount of time would probably be the one used. In the following species accounts those fishing methods ennumerated by Rostlund and other ethnographers are examined for their applicability in catching the species found at the Owl Hollow sites.

Gar skeletal remains were found at four of the Owl Hollow sites, but were numerous at none. Single elements were recovered from 40CF111, 40BD55, and 40FR45; nine elements from at least two individuals were found at 40FR7. No gar remains could be identified to species, but recent studies have found three species of gar in the Elk River and two in the Duck (Appendix A). All gar species characteristically inhabit warm, sluggish backwaters of rivers and lakes. Here they bask just beneath the water's surface, waiting for their prey to swim close enough to strike. Gars rarely take a hook (Pflieger 1975), but they could have been speared, netted, or captured in a trap or weir. Gar scales are extremely hard and many are diamond shaped; historically they were used by some groups as arrow points (Bartram 1955). Gar teeth were used by the Indians for scarification or to bleed themselves. To eat gars some groups baked

them whole in hot embers, which made the scales easy to peel off and left the meat white and tender (Bartram 1955).

Two skeletal elements from an indeterminate species of pike were found at 40FR7, the only Owl Hollow site where pike remains were found. Jandebeur (1972) did not list any pike species as occurring in the Elk River. This is rather surprising since at least two members of the pike family, the grass pickerel (Esox americanus) and the chain pickerel (Esox niger), have been collected from the Duck River (Nieland n.d.). In his distribution maps, Pflieger (1975) shows the general range for these species as covering the area of the Elk River. Both of these pickerel occur most often in the quiet water areas of rivers, creeks, and lakes where vegetation is abundant. The water must be clear and relatively unpolluted, since neither species can tolerate muddy water with a low oxygen content (Pflieger 1975). These carnivorous fish could have been taken with hook and line if live bait was used, or by nets, spears, traps, and weirs. The presence of gar and pike remains in the faunal samples suggests that the Owl Hollow peoples were focusing at least a part of their fishing effort in backwater pool areas. However, neither group was represented in significant enough numbers to have been considered a major fish resource in the diet.

Minnow remains were found at 40BD46, 40BD55, 40FR7, and 40FR45. They were particularly well represented at 40BD55 and 40FR7 (nine elements and 54 elements) where they made up respectively 10% and 9% of the total identifiable fish remains. Only two cyprinid elements

were found at 40BD46 and a single element was identified at 40FR45. A majority of the minnow remains consisted of pharyngeal arches; those that were more complete could, in some cases, be identified to the genus or species level. These include: Campostoma anomalum, cf. Phenacobius sp., Semotilus atromaculatus, Nocomis sp. and Notropis spp. Minnows can be found in a number of stream habitats but a majority of the species and genera found at 40BD55 and 40FR7 frequent rocky pools or riffle areas (Pflieger 1975; Kuhne 1939). These habitats are common in the headwater areas of the Elk and Duck rivers. Most of these species average less than seven inches in length (Eddy 1961). While minnows could have been caught in nets or fish traps and consumed by the site inhabitants, it is equally likely that they were transported to the site as the stomach contents of larger predatory fishes.

Skeletal elements of fish in the family Catostomidae were found at five of the study sites and were some of the most abundant fish remains to be recovered from the Owl Hollow excavations. While a majority of these fragmentary remains could be identified only to the family level, a few were more diagnostic and were recognized as being from the genera Ictiobus and Moxostoma, or more specifically from the northern hogsucker (Hypentelium nigricans) and the river redhorse (Moxostoma carinatum). Suckers accounted for 41% of the identifiable fish remains from 40BD55 (39 elements), 50% from 40FR7 (301 elements), and 22% at 40FR45 (16 elements). Only two sucker elements were found at 40CF108 and a single element was identified from the 40CF214 faunal remains.

Recent collections have included at least 13 species of suckers in both the Duck and Elk rivers (Appendix A). Suckers are bottom feeding fish that subsist in large part on burrowing aquatic insects and mollusks and to a lesser extent on plant material (Pflieger 1975). The northern hogsucker is a fish most commonly found in smaller streams or headwater areas having a good current and clean, rocky substrates (Kuhne 1939). River redhorses are said to inhabit pools with rocky substrates in medium size streams having a strong current (Pflieger 1975). They cannot tolerate silty water conditions. Two species of Ictiobus, the smallmouth (I. bubalus) and bigmouth buffalo (I. cyprinellus), are found in the Duck and Elk rivers. Buffalofish occur most frequently in larger rivers and their main tributaries (Pflieger 1975). Most of the Moxostoma species found in the Duck and Elk rivers prefer clear pool habitats, and rocky substrates of medium to large rivers and their major tributaries (Pflieger 1975). During the spring spawning season it would not be unusual to find in the upper Duck and Elk rivers those sucker species that usually prefer to live in deeper waters of the streams. Most suckers migrate en mass in the spring to shallow water areas with gravel substrates where they spawn. It would have been relatively easy for the Indians to collect large numbers of suckers when they were spawning in the shallow waters. Kuhne (1939) noted that a single commercial fisherman could easily catch over a ton of buffalofish in a day during their spawning run.

Not all suckers spawn at the same time and no one spawning run

probably lasts for more than a two week period (D. A. Etnier, personal communication). While there is some overlap in spawning activity, each species is thought to have a critical water temperature that must be reached before spawning will occur. In Missouri most species of Moxostoma spawn in April and May, the northern hogsucker engages in spawning activity in April and early May, and the bigmouth and smallmouth buffalofish have been recorded as spawning in late May and June (Pflieger 1975). Although slight differences exist, most suckers found in Tennessee may be expected to spawn sometime in the spring during the months of April, May or June. While suckers could have been caught at any time of the year, the Owl Hollow Indians probably concentrated on them in the spring when they were most numerous and easily taken. Pflieger (1975) notes that suckers are not often taken on hook and line, but they could have been caught with nets and spears, or in traps and weirs.

Skeletal remains from catfish were found at four of the Owl Hollow sites: 40CF108 (2 elements), 40BD55 (5 elements), 40FR7 (26 elements), and 40FR45 (9 elements). A majority of the remains could be identified only as belonging to the family Ictaluridae (24 elements). More complete skeletal elements could be recognized as being from the genera Ictalurus (16 elements) or Noturus (2 elements). All catfish are bottom feeders that are active primarily at night; during the day they generally rest in natural crevices and cavities along the stream banks. While swimming along the substrate they eat small crustaceans, fish, insects, and minor amounts of plant

matter. Catfish are generally rather solitary by nature (Pfleiger 1975). This facet of their behavior may help to explain why they are much less frequent in the faunal samples than suckers. Most catfish can be taken on a hook and line, speared, or captured in nets, traps, and weirs.

Skeletal remains of sunfish and related species, family Centrarchidae, were found at four of the Owl Hollow sites: 40BD46 (2 elements), 40BD55 (25 elements), 40FR7 (176 elements), and 40FR45 (39 elements). The majority of these remains (234 elements) were fragmented and could be identified only to the family level. Centrarchid fish in the Elk and Duck rivers include various species of bass, sunfish, and crappie (Appendix A). Five elements at 40FR7 and two elements at 40FR45 were diagnostic enough to identify as being from a species of bass (Micropterus spp.). One of the centrarchid elements from 40FR7 was determined as Lepomis sp. Sunfish are rather sedentary and generally gather only in loose aggregations around cover. They do not engage in spawning runs, but instead prepare nests near their home territories that the males guard until the eggs hatch (Pflieger 1975). The abundance of sunfish remains in the Owl Hollow samples is surprising since they never congregate in large numbers at any time of the year. This suggests that the Owl Hollow peoples may have concentrated part of their fishing efforts in those stream areas where sunfish were known to seek cover. Hand held lines are typically time consuming and uneconomical for fish capture; sunfish could have been taken more efficiently by using nets, traps and wiers.

Only a single perch (Percidae) element was identified from any of the Owl Hollow sites. This was a large maxilla from either a walleye or a sauger found at 40BD46. Nieland (n.d.) reported both of these closely related species from the Duck River. Osteologically they are nearly impossible to differentiate. While the walleye and sauger migrate to smaller streams to spawn, they generally live in loose aggregations in large rivers. This habitat preference may, in part, explain their paucity in the Owl Hollow faunal samples. The upper Duck and Elk rivers are small streams that would not generally have attracted or supported large numbers of these species. Walleye and saugers could have been taken on moving lures, or more likely in nets, traps, and weirs.

Freshwater drum remains were found at three of the study sites: 40BD55 (14 elements), 40FR7 (23 elements), and 40FR45 (4 elements). The freshwater drum is a bottom feeder that as an adult subsists almost entirely on mollusks. Specimens of this species weighing nearly 60 pounds have been taken in Tennessee (Kuhne 1939), but most adults generally weigh less than 10 pounds (Etnier, personal communication). This fish is most abundant in large rivers, lakes, and impoundments. It prefers to live in deeper pools and avoids strong currents. Spawning adults move out of the larger rivers into the smaller tributaries in April or May (Pflieger 1975). Under these circumstances they may have been taken during their spawning runs, at the same time as the suckers. Freshwater drum could have been captured with nets, spears, traps, weirs, and hook and line.

When the identifiable fish remains from all the sites are compared, it is possible to rank those fish species present in the samples according to their order of importance to the diet. Evaluation of importance was based on two factors, the number of remains from each species present in the samples and the average adult sizes of the different species. Those species which are both numerous in the samples and large in size are believed to have been more important to the diet. Fish species within the following families are represented at the Owl Hollow sites; they are ranked in order of their importance to the diet: 1) Catostomidae; 2) Centrarchidae; 3) Ictaluridae and Sciaenidae; 4) Cyprinidae; 5) Lepisosteidae; and 6) Esocidae and Percidae. Remains of species from the families Catostomidae and Centrarchidae are very abundant in the faunal samples, but the sucker elements are more numerous and represent, on the whole, larger animals. Skeletal elements from species within the families Ictaluridae and Sciaenidae are nearly equal in number. Minnow species remains are abundant in the faunal samples, but because of their small size and questionable use as food items these fish have been ranked rather low in potential importance to the diet. Although gar remains are found at four of the Owl Hollow sites, they were infrequent in occurrence; these fish would probably not have contributed significantly to the diet. There were present only two and one skeletal elements respectively from species within the families Esocidae and Percidae. With such poor representation species from these families can be considered only occasional supplements to the diet.

The Owl Hollow fish remains represent a mixed assemblage of species of different sizes, feeding habits, and habitat preferences. It is hypothesized that nonselective methods of capture would have to have been used to bring together such an assemblage. These methods would include nets, traps, weirs, and fish poisons, each of which can indiscriminately catch large numbers of fish of different species and sizes. Spearing fish is economical only when the fish to be taken can be seen easily and large numbers are available in a relatively small area. Line fishing is usually not an efficient capture method unless a number of hooks are used on a trot line. While no evidence of nets or traps could be found at any of the sites, they almost certainly existed. Peterson et al. (1984) make a strong argument that most eastern North American Indian groups were utilizing nets to capture fish by at least the Middle Archaic period (ca. 6000-3000 B.C.), and Rostlund (1952) believes that traps and weirs were used in nearly every region where fishing was practiced.

Seasonality of fishing must also be considered. Although fish would have been available for exploitation the year round, at certain times of the year they would have been more numerous or concentrated and thus more easily caught. One of these periods would have been those spring months when some fish, such as suckers and to a lesser extent the freshwater drum, gar, pike, and walleye/sauger engage in spawning runs that bring together large numbers of adults in small tributary streams. Also, during periods of low rainfall in the summer and autumn fish in backwater, pond, or swamp areas would have

been more concentrated and easily captured as these areas dried up (Limp and Reidhead 1979). While the spring and low water months of the summer may have been the most productive periods, the use of traps, weirs, nets, or poisons would have made fishing a high yield, low work effort at nearly any time of the year.

When caught in large numbers, fish may have been preserved for future consumption. Those southeastern groups recorded as preserving fish usually did so by smoking them on a grill over a slow fire or by drying them in the sun. William Strachey, however, as quoted in Swanton (1945) noted that the preserved fish of the Powhaten Indians rarely lasted for more than a month before putrification began. If Strachey is correct in his assessment, most fish were probably utilized immediately or at least very soon after their capture.

Mollusca

The phylum Mollusca was represented at the Owl Hollow sites by two classes of mollusks, the snails (Gastropoda) and the bivalves (Pelecypoda). Gastropods may be further divided into three categories: marine, terrestrial, and freshwater snails. All of the pelecypods were freshwater species belonging to the family Unionidae. Only the freshwater gastropods and pelecypods are considered to have been collected as food resources.

Gastropoda

Marine gastropods were recovered from 40CF111 and 40FR7. Two specimens of Marginella apicina were found at 40FR7 and a single

individual of the same species was recovered at 40CF111. Each of these small shells was used as a decorative item. Their spires were ground off so that a string could be threaded through the manufactured hole and the shell aperature. The shells could either have been sewn on clothing or strung as beads on a necklace. Swanton (1946) notes that Marginella shells were common trade items among historic southeastern Indian groups and were sometimes used as beads for necklaces. The modern distribution of M. apicina includes the Gulf and southern Atlantic coasts. Locally, M. apicina beads were also found with the Mississippian materials at 40CF111 in the Normandy Reservoir (Robison 1978).

Terrestrial snails were represented in quantities worthy of analysis only at 40BD55 and 40FR7. The overwhelming majority of the terrestrial snails from these sites were 4 mm or less in diameter. All are believed to be the result of natural occurrences at the site. Analysis of the terrestrial snails was undertaken with the hope that the presence of certain species or combinations of species might shed light on the local environmental conditions in at least the immediate vicinity of the site. At 40FR7 the terrestrial snails from the midden were analyzed from each of the three 10 cm excavation levels and then compared for evidence of change in the species assemblage between the upper and lower portions of the midden. Consistent change in the species assemblage would have indicated alterations in the local environment over time, e.g. the removal of the woodlands surrounding the site.

Results from the analysis of the terrestrial gastropods from 40BD55 and 40FR7 were rather disappointing. A very few species made up a majority of the collection at both sites. These species were very generalized in their habitat preferences and suggested little about the past site environmental conditions.

In general, almost all of the terrestrial gastropods that occur at 40FR7 and 40BD55 prefer to live in deciduous forests where they are often found buried in the moist leaf litter on the forest floor. Most also show a decided preference for limestone based soils or limestone outcrops. It may be presumed then that both sites, when inhabited, were only partly cleared or at least surrounded by deciduous trees. Terrestrial snails may have been drawn to the cleared site areas by the abundance of discarded freshwater snail and mussel shells whose calcium carbonate content would be used to build their own shells. They also would have been attracted to the rotting animal and plant matter in the features on which they could feed.

At 40FR7, analysis of the terrestrial snails from the three arbitrary excavation levels in the midden units found no evidence that the snails had undergone any consistent changes in frequency or species composition over time. Both midden units have nearly the same species composition, with differences that occur between the two minor and apparently random.

Identifiable freshwater gastropod shells were found at five of the Owl Hollow sites; these include 40BD46, 40BD55, 40FR7, 40FR45, and 40CF214. Sites 40BD46 and 40BD55 are located on a tributary of

the Duck River, while 40FR7, 40FR45, and 40CF214 are situated on the Elk River and two of its tributaries. Large samples of freshwater snails were obtained from sites 40BD55 (220,024 estimated specimens), 40FR7 (54,113 specimens), and 40FR45 (18,091 specimens). Identifiable freshwater snail shells from 40BD46 and 40CF214 numbered only 19 and one respectively. There were at least seven species of freshwater snails identified from the sites on each river system. An exact species breakdown for each site can be found in the individual site descriptions (Tables 9, 15, 23, and 29 on pages 71, 106, 185, and 251). The seven species from each river system belong to either the family Pleuroceridae or Viviparidae. Significantly, at each site the species belonging to Pleuroceridae make up over 99% of the total sample.

Colonies of pleurocerid snails are often made up of thousands of individuals and when the water is low they can easily be seen clinging to rocks on the stream bottom. It would have been a simple task to pick up the smaller rocks and scrape the snails into a basket. Although viviparid snails seem to have been gathered when encountered, no efforts appear to have been made to purposely seek them out. Viviparid snails were either quite rare in these river systems or it took more time and energy to find them than was economically feasible for the return gained.

Little detailed information exists on the means used to prepare freshwater snails for consumption. Clench (1974) suggests that the pleurocerid snails recovered from Russell Cave were roasted or

boiled, the spire tip broken, and the snail soft parts sucked out from the aperature. Since the viviparid snails from Russell Cave displayed no shell damage, Clench feels that the soft parts of these snails were extracted from the aperature by using a bone or wooden needle. Morrison (1942) found few signs of burning on the shells he examined from the Pickwick Reservoir and suggests that freshwater gastropods were steamed in a pit beneath a fire to cook them and then extracted by some means that did not break the shell. It is also possible that the snails were boiled in their shells as part of a broth and may not have been extracted at all. Some of the freshwater snails found at the Owl Hollow sites have had the tips of their spires broken off and others are complete. The exact means used by the Owl Hollow peoples to prepare these snails for consumption is unknown.

No references could be located that detailed the nutritive value of any North American freshwater snails. For Central America, however, a reference was found on the nutritive value of Vivipara quadrata, a species of Viviparidae similar to those viviparid species found at the Owl Hollow sites. Based upon a raw 100 gram (g) edible portion, Vivipara quadrata is composed of 80 g water, 79 calories, 16 g protein, 1 g fat, 1.5 g carbohydrates, 110 mg calcium, and 1.4 mg iron (Platt 1945). These figures are very similar to those given in the United States Department of Agriculture Handbook No. 8 (Watt and Merrill 1975) for the nutritive value of an unidentified species of snail (terrestrial or freshwater ?). This unknown species of snail,

based upon 100 g of raw flesh, consists of 79.2 g of water, 90 calories, 16.1 g protein, 1.4 g fat, 2.0 g carbohydrates, and 3.5 mg iron. Except for the snail's slightly higher caloric value, these figures on snail nutritive content compare very favorably with those obtained by Parmalee and Klippel (1974) for two species of freshwater mussels.

It is probable that the nutritive value of those freshwater snails found on Owl Hollow sites would be similar to the figures given for Viviparа quadrata and the indeterminate species of snail. If this is true, freshwater snails would be very low in nutritive value when compared to most mammal, bird, and fish species (Parmalee and Klippel 1974). Based upon this data, it might be presumed that freshwater snails, no matter how numerous on a site, served only as supplements to the regular diet, or were relied upon only when other game was unavailable. Freshwater gastropods, according to Leonard (1959), may be gathered any time of the year except when the surface of the water is frozen or the stream is flooded. This near constant availability, in conjunction with their ease of collection, may have made freshwater gastropods an important backup meat resource in spite of their poor nutritive value.

Pelecypoda

Identifiable freshwater pelecypods were recovered from 40BD55, 40FR7, and 40FR45. The first site is situated on the Duck River and the latter two are located on the Elk River (40FR7) and a tributary, Town Creek (40FR45). At least 23 different species were represented

in the Duck River materials and 16 species were identified from the Elk River samples. A majority of the mussels identified at each site were Cumberlandian species; 10 in the Elk River sample and 12 in the Duck River sample (Tables 11, 22, and 28 on pages 98, 179, and 249). Cumberlandian mussel species appear to be restricted in their distribution to the Tennessee River above Muscle Shoals, Alabama, and the upper Duck, Elk and Cumberland rivers (Ortmann 1925). These species generally inhabit streams and small rivers that have a swift current, relatively shallow water, sand and gravel substrates, and little silt (Warren 1975). All the mussel species found at these three sites were represented by small, compressed forms that are most typical of the headwaters or tributaries of the Duck and Elk rivers. Most could easily have been collected from stream riffle areas near the sites where they were found.

A number of hypotheses have been advanced on the methods possibly used by prehistoric Indians to prepare mussels for consumption. Baker (1941) reports that clambakes were found at the Kingston site in Illinois. In these clambakes the mussels were carefully nested and covered with clay to be baked, but were never removed. The Kingston site is Middle Mississippian in origin, but Middle Woodland groups may have used a similar technique. After an examination of the shells from the Archaic shell mounds in the Pickwick Basin, Morrison (1942: 381) makes the following comments:

> The mussels were steamed open for eating as proven by the quantities of water-cracked rock fragments that were present in the shell deposits. These rocks were river cobbles, brought in by the Indians, and heated by them in a

> fire, before the mussels were placed over the rocks for cooking. They must have been used over and over again, as the pieces remaining are small, having been split apart many times by the action of the water and juices coming from the mussels.

Clench (1974) states that the large number of broken mussel shells in Russell Cave indicate that they were broken open while still alive and not cooked first. It is suggested that the mussels may have been eaten raw. Swanton (1946) quotes Lawson as stating that the Indians boiled shellfish for five or six hours to make them tender for eating. But Lawson was still in doubt as to whether the boiling process would make the shellfish palatable to most Europeans. Brose (1972), who agrees with Lawson's verdict on shell fish palatability, states that boiling mussels results in a loss of water, shrinkage of the tissues, and an overall toughening of the meat.

Most of the mussel valves recovered from the Owl Hollow sites are complete or nearly complete. They appear, generally, to have been opened after the muscles holding the valves together had relaxed; none show signs of forced entry. No mussels were found in clay "clam bakes" as reported by Baker (1941). There is some possibility, however, that they could have been steamed in the limestone filled earth ovens found on most Owl Hollow sites.

Pelecypods have been found by Parmalee and Klippel (1974) to be poor food resources from a nutritional standpoint. When compared to mammals, birds and fish, mussels are found to be the lowest in nutritional content. Parmalee and Klippel (1974) suggest that because of the mussel's low caloric content, it may have been used

only as a dietary supplement and not as a dietary mainstay as has been suggested in the past (Webb 1940; Matteson 1958). Prehistoric Indian groups did not, however, judge a food resource solely by its caloric content, but rather reliability and availability were probably the major factors of importance. Freshwater mussels, for this reason, may have been seen as a dependable food when other meat resources were unavailable. Although mussels are capable of limited movement, they generally spend their entire lifetime within a radial distance of a few hundred yards (Parmalee 1967). Mussel beds could have been easily located and large numbers of shells gathered in a short time to supplement other plant and animal foods in the diet.

Meehan (1977a and 1977b), in working with the Australian aborigines, describes how the aborigines rely heavily on shellfish in combination with other gathering activities when preferred meat resources are seasonally unavailable or scarce. M. K. Bennett, in an article entitled "The Food Economy of New England Indians 1605-75" (1955: 373), relates the following 1634 quote by Wood on an unknown group of New England Indians:

> They keepe no set meales, their store being spent, they champe on the bit, till they meete with fresh supplies, either from their own endeavours, or their wives industry, who trudge to the Clambankes when all other meanes faile . . .

It is suggested here that both freshwater mussels and snails may have been utilized as "hard times" food items, predominately in the spring when other food resources were unavailable. This contention is strongly supported by evidence found at the Peters site (40FR45).

Two large and deep storage pits (Features 6 and 12) were excavated at this site. Their stratified contents are thought to represent spring and summer refuse dumped into the pits after winter stores were removed (Cobb and Faulkner 1978). The first refuse thrown into these features should represent the remains of activities carried on soon after these pits were emptied (presumably in the late winter or early spring). In each feature the bottom stratigraphic level is largely made up of freshwater pelecypod and gastropod shells mixed with ash. The upper levels, which are thought to have been deposited during the summer/early autumn, also contain mollusk shells, but they were usually not as concentrated as in the lowermost ash levels. It appears that the Owl Hollow peoples utilized mollusks most heavily in the spring, probably when food stores were expended and other plant and animal resources were scarce or not yet available.

Further evidence substantiating this type of exploitation pattern was found at the nearby Mason site (40FR8), the type site for the Late Woodland Mason culture (Faulkner 1968). Two storage pits (Features 9 and 15) at this site nearly duplicate the situation found at the Peters site. Here, again, the lower levels of the features contained primarily snail shells mixed with ash. The upper levels of Feature 9 contained no additional snail shells, but Feature 15 had three separate lenses of ash and snail shells, one nearly at the bottom of the feature, one near its center, and one almost at the top. Faulkner (1968) feels that this feature was rapidly filled after its abandonment, possibly before spring was over. Judging from

the evidence available, the Mason peoples do not appear to have used a large quantity of mollusks, but, as with the Owl Hollow culture, they seem to have used them in the early spring.

In his study of the Archaic cultural groups which inhabited the central Duck River basin, Hofman (1984) hypothesizes that mollusks may have been utilized as food resources during times of stress, when preferred foods were unavailable. They were thought to have been most heavily exploited in the springtime. If Hofman's hypothesis is correct the pattern of using mollusks as a "hard times" food may have considerable antiquity in Middle Tennessee.

Plant Foods and Resource Scheduling

Plant foods undoubtedly played a major role in the Owl Hollow subsistence system. Much of the structure of the Owl Hollow culture would have been determined by the seasonal scheduling of plant and animal exploitation. To better understand the interaction between these two activities a brief overview of Owl Hollow plant utilization will be presented.

Plant foods are thought to have probably made up a majority of the Owl Hollow diet. For most hunting and gathering groups meat is generally thought of as the "prestige" or desired food resource, but plant foods in most cases make up a majority of the daily fare (Lee and DeVore 1968). A large number of potentially edible plants are known to exist in the vicinity of the eight Owl Hollow sites. For a more detailed accounting of the edible plant species that might have

been utilized in the upper Duck and Elk river areas, a table compiled by Shea (1978) on the native plants of economic value in the upper Duck River Valley may be consulted. The upper Duck and Elk river valleys are spatially very close and lie within the same biogeographic zone, therefore, it may be presumed that the plant species makeup of each valley would be similar.

Nut bearing trees and shrubs, such as the hickories, oaks, walnut, chestnut, butternut (Juglans cinerea), beech (Fagus grandifolia), and hazel (Corylus americana), were possibly some of the most valuable sources of plant food to the Indians. The nuts from each of these trees and shrubs ripen during the autumn months, but not all species become available at the same time. Hazelnuts are generally the first to ripen in August, while beechnuts and acorns begin to fall in September; by October the mast from the hickory, chestnut, and walnut trees is also available. Because they are easily stored in large numbers, nuts were probably one of the major plant foods used to tide over the Owl Hollow peoples during the winter months. Crites (1978a), in fact, has documented the presence of large amounts of carbonized hickory nut shell from Owl Hollow sites, with lesser amounts of walnut and acorn shell also being present.

A number of weedy annual plants are thought to have played an important role in Owl Hollow subsistence. Species of goosefoot, knotweed, giant ragweed (Ambrosia trifida), pigweed, and pokeweed (Phytolacca americana) all grow naturally in open areas where the

soil has been recently disturbed. In the wild these plants are most often found on open mud flats along rivers or near the open edges of swamps. The cleared edges of the Owl Hollow sites, with their high nitrogen content from refuse dumping might also have been an excellent habitat for the growth of these annual plants. It has been suggested by Struever (1962, 1964) and others that a number of these herbaceous plants (such as goosefoot and pigweed) may have been cultivated. Crites (1978a), however, has found no evidence for their cultivation. Encouragement for the growth of weedy annuals might have consisted only of firing parts of the floodplains of the Elk or Duck rivers, or the edges of Mingo Swamp. Guffey (1977) and Cronon (1983) have recently suggested that firing portions of the forest may have been a pre-Columbian practice, carried out to capture animals (especially deer) and also to encourage an increase in deer and turkey numbers by creating a more favorable open habitat. Some thought has also been given to the possibility that the Oak Barrens may have been, in part, the result of past burnings (Nichols 1971).

The shoots from goosefoot and knotweed are edible and could be consumed in May or June, while the seeds from mature plants of each genus ripen in September or October. Young shoots of pokeweed may be used in the late spring (approximately April or May). Dockweed matures somewhat later during the summer and could have been utilized in July and August. Giant ragweed, which some speculate may have been used as an aboriginal food resource, ripens in the late autumn (about September).

Maygrass would have been available in May or June, and fruity plants such as raspberries, black berries, and dew berries ripen during the summer in July or August. The fruit from the sumac bush could have been used in September.

Only a small percentage of the edible plant species would have been available for exploitation throughout the entire year. Possibly one of the best known of these species is the cattail. Portions of this plant are edible at any time of the year: young shoots in the spring; the stems during the summer; and the plant head throughout the autumn and winter. The duck potato, an aquatic plant with a tuber-like root, would always have been accessible except when the water was frozen over. Similarly, the hog peanut, a terrestrial plant with tuberous roots, would have been available so long as the soil was not frozen. Cat briars may also have been used in any season.

Cultigens must be considered when examining Owl Hollow plant food utilization. Those cultigens associated with the Owl Hollow sites include squash, gourd, maize, and a domesticated variety of sunflower. Only the sunflower is an indigenous cultigen; the other three are tropical in origin. Sunflower remains have been recovered from 40FR7 and 40FR45; squash at 40CF111, 40CF32, 40BD55, 40FR7, and 40FR45; gourd at 40FR45; and maize at 40CF32, 40BD55, and 40FR45 (Cobb and Shea 1977; Crites 1978a). Unlike maize, sunflowers and squash were found at both early and later period Owl Hollow occupations and in upland and floodplain locations. Neither

sunflowers nor squash require many man hours of maintenance for a successful harvest; both are ready for consumption in the late summer.

Sunflower and squash remains were found at a number of the earlier McFarland culture sites (Crites 1978b). Maize remains, however, were identified from only two McFarland sites, two grain fragments from the Ewell III site (40CF118) in the Normandy Reservoir (Crites 1978b) and a single cupule from the McFarland type site (40CF48) (Kline et al. 1982). Site 40FR7, which is the earliest of the known Owl Hollow occupations, is located in the uplands and had no maize remains. Maize has been found at three Owl Hollow sites (40CF32, 40BD55, and 40FR45), all from the middle period of Owl Hollow development, A.D. 400-600. These three sites and others (40CF108 and 40CF111) from this time period are located near fertile river floodplains. The abandonment of upland settlement areas is thought to have been caused by a decision on the part of the Owl Hollow peoples to concentrate more of their subsistence efforts on maize horticulture (Cobb and Faulkner 1978). This change would have been gradual; maize is believed to have been only another plant supplement, not a mainstay, in the Owl Hollow diet.

Decisions that affect traditional diet are not made capriciously, but for specific reasons. The Owl Hollow shift to more permanent settlements in the floodplain and the increased emphasis on maize production may have been due to population increases (Cohen 1977). These numerical increases probably occurred within the Owl

Hollow population itself, and equally important, within neighboring cultural groups. With restricted free movement to new territories and their own population increasing in size, the Owl Hollow peoples would have been forced to settle in more permanent villages. If the traditional food exploitation system was no longer capable of meeting the nutritional needs of the group they would have expanded in some fashion the amount or number of food resources exploited. Evidence of this is seen in the new emphasis placed on maize production and the increased utilization of existing local resources, most noticeably freshwater mussels and snails. Earlier McFarland populations are thought to have shifted their camps more frequently than the Owl Hollow groups and there is little evidence that they utilized maize or mollusks with any regularity (Kline et al. 1982).

Owl Hollow plant and animal exploitation strategies would have intermeshed so as to not interfere with each other. This may have been accomplished in two ways, either by sexual division of labor or by scheduling. When desired plants and animals became available at the same time, the harvesting of these resources was probably split along sexual lines. For the Owl Hollow peoples it is believed that the majority of the plant foods were gathered by the women and that hunting and trapping were almost exclusively male activities. This sort of behavior is customary among most hunting and gathering groups (Lee and DeVore 1968). Fishing may have been either a male or female function. Traditionally, cooking and preservation of foods, both plant and animal, and curing of animal hides was women's work. By

dividing subsistence tasks in this manner each may be efficiently carried out simultaneously with no detriment to the other. However, if it was most efficient for both sexes to work together to exploit a particularly valuable resource and its harvest did not overlap with the exploitation of a more productive resource, time would have been scheduled or allotted for both sexes to assist in the harvest of that resource (i.e. spring sucker runs and winter deer hunts for meat and hides).

Although no attempt will be made to do detailed catchment studies of each of the eight sites being considered for this study, a few general observations can be made about human exploitation of the environment. A human exploitation territory has geographical boundaries--political, as imposed by interaction with other human groups, and practical, as defined by the principle of least effort (Zipf 1949). Restricted political boundaries imposed by growing populations may have been the primary reason for more permanent settlements and the initiation of more intensive agricultural practices. Jarman (1972: 706) relates the following considering practical boundaries of human exploitation:

> Human populations, urban, rural, and non-agricultural, do not exploit their surroundings at random, and for any set of circumstances at a particular site there are norms that characterize the limits or thresholds beyond which exploitation of a resource is unprofitable and is unlikely to take place in the long run.

Most resource catchment models map a site's exploitation territory by means of time contours around the site periphery. These time contours represent distances which may be comfortably reached

from the site by walking for a given period of time. Based upon relatively easy walking conditions in nearly flat terrain, Jarman (1972) feels that most persons can walk approximately 1 km in ten minutes, 5 km in one hour and 10 km in two hours. It is felt, based upon studies by Lee (1969) on the Kung Bushmen and Davidson (1928) on the Australian aborigines, that the hunting territories for most groups would generally not extend more than 10 km from the base camp. The site exploitation territory for gathering activities, which are generally conducted by women, is even more restricted in size (Jarman 1972). Woodburn (1968) feels that Hazda women obtain a majority of their plant food within an hour's walk of their base camp (approximately 5 km). Geographic barriers and resource placement, of course, made actual aboriginal catchments irregular in shape. These distance figures for consideration of catchment size can probably be applied to the Owl Hollow situation. With the exception of a single species of marine snail, all the animals associated with the Owl Hollow sites are either resident species or seasonal migrants that could easily have been exploited within 10 km of the base camps. All those plant species found at the Owl Hollow sites could have been collected or grown at locations within 5 km of the base camps. While hunting and gathering forays may have extended, on occasion, beyond these limits, it is believed that the majority of the Owl Hollow subsistence activities took place within 10 km of the base camp.

Summary

Possibly the easiest means of summarizing the Owl Hollow faunal exploitation system would be to describe the primary means by which animals were exploited. These activities were: 1) hunting and trapping, 2) fishing, and 3) gathering. Although many faunal resources were undoubtedly taken on an opportunistic basis, these primary exploitation activities would largely have been scheduled to take advantage of desired animal species when they were most abundant, in their best condition, or simply when needed in the diet during times of shortage. The Owl Hollow peoples seem to have attempted to maximize their yield for a minimum of physical effort. Those species which were able to maintain large populations and had high meat yields per individual were most heavily utilized, while animals that were naturally less frequent in numbers or contribute lower meat yields per individual were taken less often.

A majority of the Owl Hollow meat supply appears to have been garnered from hunting and trapping activities. The white-tailed deer is represented at all eight of the sites examined and was undoubtedly the most sought after and valuable of the Owl Hollow meat resources. Smaller mammals (i.e. raccoon, skunk, squirrels, rabbits, etc.) and the turkey would have been important dietary supplements and appear to have been hunted on a fairly regular basis. Other large mammals, such as the elk and cougar, are believed to have occurred only in small numbers in the project area and were thus hunted infrequently.

The total absence of bear remains from the samples is surprising, but is thought to be the result of ceremonial disposal of their remains rather than an avoidance of their use. Game birds, such as waterfowl, the sandhill crane, passenger pigeon, grouse, quail, etc., were taken when available, but their remains occur so rarely in the samples that they must be considered only incidental supplements to the diet. Large game animals, such as the white-tailed deer, were probably actively hunted by individuals or groups of Owl Hollow hunters. Most smaller mammals, on the other hand, are thought to have been trapped or snared since their meat yield often would not match the calories expended by the hunter to chase them down. Hunting and trapping activities were probably ongoing throughout the year as meat was needed, but the greatest emphasis on hunting may have been in the autumn and early winter when the animals and their hides were in prime condition. Also, animals such as deer and elk are less cautious and more easily taken during their autumn breeding season.

Fishing activities contributed numerous supplemental resources to the Owl Hollow diet. Although fishing can be conducted in some form throughout the year, the principal emphasis on fishing would have been during those seasons when large catches were most predictable. The spring and late summer are believed to have been such times. During the spring most sucker species, and to a lesser extent the freshwater drum, gar, pike, and walleye/sauger, move in large numbers to spawn in the shallow waters of tributary streams or

the river headwaters. While concentrated in shallow water these species would have been easily netted or speared. In the late summer, when water levels were low, fish would have been more readily captured when concentrated in river pools and backwater sloughs. The fact that rough fish species (suckers, freshwater drum, and catfish) and game fish species (sunfish) are both abundant in the faunal samples, suggests that a non-selective method of capture was often used, such as nets, fish traps, or weirs. Fish were not the only resource taken while fishing; aquatic turtles and hellbenders were probably caught at the same time and must be considered part of the bounty from this activity. Based upon ethnographic accounts for the Southeast (Swanton 1946), fishing may have been either a male or female activity.

Gathered meat resources include those animals or animal products which do not move or move so slowly as to be easily picked up. At the Owl Hollow sites these resources include freshwater mussels and snails, the box turtle, and bird eggs. The box turtle and the bird eggs would have been seasonal resources. Bird eggs would have been available only in the spring and early summer. Box turtles are active during the late spring through the early autumn. Freshwater snails and mussels, however, could have been collected at any time except under frozen or high water conditions. As such, they may have been an important meat resource used to supplement the diet when other animals were unavailable. Any of the gathered resources listed above could have been collected by women and children or men.

The Owl Hollow faunal exploitation pattern is believed to be very similar to that described for the Late Woodland Mason site in the Tims Ford Reservoir (Parmalee 1968a) and the Mississippian sites in the Normandy Reservoir (Robison 1978). The only obvious difference, with the exception of the Normandy Reservoir sites, is the increased utilization of freshwater mollusks by the Owl Hollow peoples. As noted previously, the Owl Hollow peoples may have used mollusks as a "hard times" food when stored foods were used up in the spring. Late Woodland Mason and Mississippian Banks phase groups may have grown and stored larger amounts of maize, thus lessening their dependence on marginal resources such as freshwater mollusks.

The Owl Hollow faunal exploitation pattern fits easily within the overall pattern described by Robison (1978: 595) for Indian cultures of the eastern United States:

> . . . the author hypothesizes that large game animals, the most important being the white-tailed deer, were the major meat resources for the Indian cultures of eastern North America from the Archaic cultural period through the Mississippian period. For the same cultural periods mollusks and smaller vertebrates were secondary meat resources for supplying additional protein to the Indian diet. Small vertebrates provided a minor, but relatively consistent, percentage of the diet through time . . . The similarities of the faunal exploitative systems from the Archaic period through the Mississippian period are definitely more striking than the differences.

Hofman (1984) in his study of the Archaic hunter-gatherers of the Nashville Basin (8000-5000 B.P.) largely agrees with the author's contention that the basic animal exploitation patterns for most eastern North American groups were developed soon after the end of the Pleistocene and the extinction of the megafauna. This is not to

say, however, that the faunal exploitation patterns for eastern North America have been completely described. There were numerous geographic variations in the exploitation systems that were caused by regional animal availability (coastal vs inland, north vs south, etc.) or acceptability to different Indian groups. Also, as has been noted with the Owl Hollow culture and its use of freshwater mollusks, stress can cause variations in the diet. Future zooarchaeological studies for the eastern United States should concentrate on the variations noted in the basic faunal exploitation system for that region and attempt to explain these differences in terms of geographic animal availability, Indian acceptability (as affected by taste preference or cultural taboo), or dietary stress.

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APPENDIXES

APPENDIX A

Vertebrates and Selected Invertebrates of Middle Tennessee

Mammals

Didelphiidae	
Didelphis marsupialis	Opossum
Soricidae	
Sorex longirostris	Southeastern Shrew
Cryptotis parva	Least Shrew
Blarina brevicauda	Short-tailed Shrew
Talpidae	
Scalopus aquaticus	Eastern Mole
Vespertilionidae	
Myotis lucifugus	Little Brown Myotis
Myotis keeni	Keen Myotis
Myotis grisescens	Gray Myotis
Myotis sodalis	Indiana Myotis
Myotis subulatus	Small-footed Myotis
Lasionycteris noctivagans	Silver-footed Bat
Pipistrellus subflavus	Eastern Pipistrel
Lasiurus borealis	Red Bat
Eptesicus fuscus	Big Brown Bat
Lasiurus cinereus	Hoary Bat
Nycticeius humeralis	Evening Bat
Plecotus rafinesquei	Eastern Big-eared Bat
Ursidae	
Ursus americanus	Black Bear
Procyonidae	
Procyon lotor	Raccoon
Mustelidae	
Mustela frenata	Long-tailed Weasel
Mustela vison	Mink
Lutra canadensis	River Otter
Spilogale putorius	Spotted Skunk
Mephitus mephitis	Striped Skunk
Canidae	
Canis lupus *	Gray Wolf

Canis niger *	Red Wolf
Vulpes fulva	Red Fox
Urocyon cinereoargenteus	Gray Fox
Felidae	
Felis concolor	Mountain Lion
Lynx rufus	Bobcat
Sciuridae	
Marmota monax	Woodchuck
Tamias striatus	Eastern Chipmunk
Glaucomys volans	Southern Flying Squirrel
Castoridae	
Castor canadensis	Beaver
Cricetidae	
Reithrodontomys humulis	Eastern Harvest Mouse
Peromyscus leucopus	White-footed Mouse
Peromyscus maniculatus	Deer Mouse
Peromyscus gossypinus	Cotton Mouse
Peromyscus nuttalli	Golden Mouse
Neotoma floridana	Eastern Woodrat
Oryzomys palustris	Rice Rat
Sigmodon hispidus	Hispid Cotton Rat
Synaptomys cooperi	Southern Bog Lemming
Microtus ochrogaster	Prairie Vole
Microtus pinetorum	Pine Vole
Ondatra zibethica	Muskrat
Muridae	
Rattus norvegicus +	Norway Rat
Rattus rattus +	Black Rat
Mus musculus +	House Mouse
Zopodidae	
Zapus hudsonius	Meadow Jumping Mouse
Erethizontidae	
Erethizon dorsatum *	Porcupine
Leporidae	
Sylvilagus floridanus	Eastern Cottontail
Sylvilagus aquaticus	Swamp Rabbit
Cervidae	
Cervus canadensis *	Elk
Odocoileus virginianus	Whitetail Deer
Bovidae	
Bison bison *	Bison

* = extirpated in Tennessee.
+ = introduced.

Sources: Roger W. Barbour and Wayne H. Davis, 1969, Bats of America, The University Press of Kentucky, Lexington; E. Raymond Hall, 1981, The Mammals of North America, Second Edition, Volumes 1 and 2, John Wiley and Sons, New York; J. O. Whitaker, Jr., 1980, The Audubon Society Field Guide to North American Mammals, Alfred A. Knopf, New York.

Birds

Gaviidae	
Gavia immer	Common Loon
Podicipedidae	
Podiceps auritus	Horned Grebe
Podilymbus podiceps	Pied-billed Grebe
Pelecanidae	
Pelecanus erythrorhynchos	American Pelican
Phalacrocoracidae	
Phalacrocorax auritus	Double-creasted Cormorant
Ardeidae	
Ardea herodias	Great Blue Heron
Butorides striatus	Green Heron
Egretta caerulea	Little Blue Heron
Casmerodius albus	Great Egret
Nycticorax nycticorax	Black-crowned Night Heron
Nycticorax violaceus	Yellow-crowned Night Heron
Ixobrychus exilis	Least Bittern
Botaurus lentiginosus	American Bittern
Ciconiidae	
Mycteria americana	Wood Stork
Anatidae	
Cygnus columbianus	Tundra Swan
Branta canadensis	Canada Goose
Chen caerulescens	Snow Goose
Anas platyrhynchos	Mallard
Anas rubripes	American Black Duck
Anas strepera	Gadwall
Anas acuta	Northern Pintail
Anas crecca	Green-winged Teal
Anas discors	Blue-winged Teal

Anas americana	American Widgeon
Anas clypeata	Northern Shoveler
Aix sponsa	Wood Duck
Aythya americana	Redhead
Aythya collaris	Ring-necked Duck
Aythya valisineria	Canvasback
Aythya marila	Greater Scaup
Aythya affinis	Lesser Scaup
Bucephala clangula	Common Goldeneye
Bucephala albeola	Bufflehead
Clangula hyemalis	Oldsquaw
Oxyura jamaicensis	Ruddy Duck
Lophodytes cucullatus	Hooded Merganser
Mergus merganser	Common Merganser
Mergus serrator	Red-breasted Merganser
Cathartidae	
Cathartes aura	Turkey Vulture
Coragyps atratus	Black Vulture
Accipitridae	
Ictinia mississippiensis	Mississippi Kite
Accipiter striatus	Sharp-shinned Hawk
Accipiter cooperii	Cooper's Hawk
Buteo jamaicensis	Red-tailed Hawk
Buteo lineatus	Red-shouldered Hawk
Buteo platypterus	Broad-winged Hawk
Buteo lagopus	Rough-legged Hawk
Aquila chrysaetos	Golden Eagle
Haliaeetus leucocephalus	Bald Eagle
Circus cyaneus	Northern Harrier
Pandion haliaetus	Osprey
Falconidae	
Falco peregrinus	Peregrine Falcon
Falco columbarius	Merlin
Falco sparverius	American Kestrel
Phasianidae	
Bonasa umbellus	Ruffed Grouse
Colinus virginianus	Bobwhite
Meleagris gallopavo	Turkey
Gruidae	
Grus canadensis	Sandhill Crane
Rallidae	
Rallus elegans	King Rail
Rallus limicola	Virginia Rail
Porzana carolina	Sora Rail

Coturnicops noveboracensis	Yellow Rail
Laterallus jamaicensis	Black Rail
Porphyrula martinica	Purple Gallinule
Gallinula chloropus	Common Moorhen
Fulica americana	American Coot
Charadriidae	
Charadrius semipalmatus	Semipalmated Plover
Charadrius melodus	Piping Plover
Charadrius vociferus	Killdeer
Pluvialis dominica	Lesser Golden Plover
Pluvialis squatarola	Black-bellied Plover
Scolopacidae	
Scolopax minor	American Woodcock
Gallinago gallinago	Common Snipe
Bartramia longicauda	Upland Sandpiper
Actitis macularia	Spotted Sandpiper
Tringa solitaria	Solitary Sandpiper
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Calidris melanotos	Pectoral Sandpiper
Calidris fuscicollis	White-rumped Sandpiper
Calidris minutilla	Least Sandpiper
Calidris alpina	Dunlin
Calidris pusilla	Semipalmated Sandpiper
Calidris mauri	Western Sandpiper
Calidris alba	Sanderling
limnodromus griseus	Short-billed Dowitcher
Limnodromus scolopaceus	Long-billed Dowitcher
Laridae	
Larus argentatus	Herring Gull
Larus delawarensis	Ring-billed Gull
Larus philadelphia	Bonaparte's Gull
Sterna forsteri	Forster's Tern
Sterna hirundo	Common Tern
Sterna caspia	Caspian Tern
Chlidonias niger	Black Tern
Columbridae	
Zenaida macroura	Mourning Dove
Cuculidae	
Coccyzus americanus	Yellow-billed Cuckoo
Coccyzus erythropthalmus	Black-billed Cuckoo
Tytonidae	
Tyto alba	Barn Owl

Strigidae	
Otus asio	Eastern Screech Owl
Bubo virginianus	Great Horned Owl
Strix varia	Barred Owl
Asio otus	Long-eared Owl
Asio flammeus	Short-eared Owl
Aegolius acadicus	Northern Saw-whet Owl
Caprimulgidae	
Caprimulgus carolinensis	Chuck-will's-widow
Caprimulgus vociferus	Whip-poor-will
Chordeiles minor	Common Nighthawk
Apodidae	
Chaetura pelagica	Chimney Swift
Trochilidae	
Archilochus colubris	Ruby-throated Hummingbird
Alcedindae	
Ceryle alcyon	Belted Kingfisher
Picidae	
Colaptes auratus	Common Flicker
Melanerpes pileatus	Pileated Woodpecker
Centurus carolinus	Red-bellied Woodpecker
Melanerpes erthrocephalus	Red-headed Woodpecker
Sphyrapicus varius	Yellow-bellied Sapsucker
Picoides villosus	Hairy Woodpecker
Picoides pubescens	Downy Woodpecker
Picoides borealis	Red-cockaded Woodpecker
Tyrannidae	
Tyrannus tyrannus	Eastern Kingbird
Myiarchus crinitus	Great Creasted Flycatcher
Sayornis phoebe	Eastern Phoebe
Empidonax flaviventris	Yellow-bellied Flycatcher
Empidonax virescens	Acadian Flycatcher
Empidonax traillii	Willow Flycatcher
Empidonax minimus	Least Flycatcher
Contopus virens	Eastern Wood Pewee
Contopus borealis	Olive-sided Flycatcher
Alaudidae	
Eremophia alpestris	Horned Lark
Hirundinidae	
Tachycineta bicolor	Tree Swallow
Riparia riparia	Bank Swallow
Stelgidopteryx serripennis	Rough-winged Swallow

Hirundo rustica	Barn Swallow
Hirundo pyrrhonota	Cliff Swallow
Progne subis	Purple Martin
Corvidae	
Cyanocitta cristata	Blue Jay
Corvus corax	American Raven
Corvus brachyrhynchos	Common Crow
Paridae	
Parus atricapillus	Black-capped Chickadee
Parus carolinensis	Carolina Chickadee
Parus bicolor	Tufted Titmouse
Sittidae	
Sitta carolinensis	White-breasted Nuthatch
Sitta canadensis	Red-breasted Nuthatch
Certhiidae	
Certhia americana	Brown Creeper
Troglodytidae	
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Thryomanes bewickii	Bewick's Wren
Thryothorus ludovicianus	Carolina Wren
Cistothorus palustris	Marsh Wren
Cistothorus platensis	Sedge Wren
Mimidae	
Mimus polyglottos	Mockingbird
Dumetella carolinensis	Gray Catbird
Toxostoma rufum	Brown Thrasher
Muscicapidae	
Turdus migratorius	American Robin
Hylocichla mustelina	Wood Thrush
Catharus guttatus	Hermit Thrush
Catharus ustulatus	Swainson's Thrush
Catharus minimus	Gray-cheeked Thrush
catharus fuscescens	Veery
Sialia sialis	Eastern Bluebird
Polioptila caerulea	Blue-gray Gnatcatcher
Regulus satrapa	Golden-crowned Kinglet
Regulus calendula	Ruby-crowned Kinglet
Motacillidae	
Anthus spinoletta	Water Pipit

Bombycillidae	
Bombycilla cedrorum	Cedar Waxwing
Laniidae	
Lanius ludovicianus	Loggerhead Shrike
Vireonidae	
Vireo griseus	White-eyed Vireo
Vireo flavifrons	Yellow-throated Vireo
Vireo solitarius	Solitary Vireo
Vireo olivaceus	Red-eyed Vireo
Vireo philadelphicus	Philadelphia Vireo
Vireo gilvus	Warbling Vireo
Emberizidae	
Mniotilta varia	Black-and-white Warbler
Protonotaria citrea	Prothonotary Warbler
Limnothlypis swainsonii	Swainson's Warbler
Helmitheros vermivorus	Worm-eating Warbler
Vermivora chrysoptera	Golden-winged Warbler
Vermivora pinus	Blue-winged Warbler
Vermivora peregrina	Tennessee Warbler
Vermivora celata	Orange-crowned Warbler
Vermivora ruficapilla	Nashville Warbler
Parula americana	Northern Parula Warbler
Dendroica petechia	Yellow Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica tigrina	Cape May Warbler
Dendroica caerulescens	Black-throated Blue Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica virens	Black-throated Green Warbler
Dendroica cerulea	Cerulean Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica dominica	Yellow-throated Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica castanea	Bay-breasted Warbler
Dendroica striata	Blackpoll Warbler
Dendroica pinus	Pine Warbler
Dendroica discolor	Prarię Warbler
Dendroica palmarum	Palm Warbler
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Seiurus motacilla	Louisiana Waterthrush
Oporornis formosus	Kentucky Warbler
Oporornis agilis	Connecticut Warbler
Oporornis philadelphia	Mourning Warbler
Geothlypis trichas	Common Yellowthroat
Icteria virens	Yellow-breasted Chat
Wilsonia pusilla	Wilson's Warbler
Wilsonia canadensis	Canada Warbler

Setophaga ruticilla	American Redstart
Dolichonyx oryzivorus	Bobolink
Sturnella magna	Eastern Meadowlark
Agelaius phoeniceus	Red-winged Blackbird
Icterus spurius	Orchard Oriole
Icterus galbula	Northern Oriole
Euphagus carolinus	Rusty Blackbird
Euphagus cyanocephalus	Brewer's Blackbird
Quiscalus quiscula	Common Grackle
Molothrus ater	Brown-headed Cowbird
Piranga olivacea	Scarlet Tanager
Piranga rubra	Summer Tanager
Cardinalis cardinalis	Northern Cardinal
Pheucticus ludovicianus	Rose-breasted Grosbeak
Guiraca caerulea	Blue Grosbeak
Passerina cyanea	Indigo Bunting
Spiza americana	Dickcissel
Pipilo erthrophthalmus	Rufous-sided Towhee
Passerculus sandwichensis	Savannah Sparrow
Ammodramus savannarum	Grasshopper Sparrow
Ammodramus leconteii	LeConte's Sparrow
Ammodramus henslowii	Henslow's Sparrow
Ammodramus caudacutus	Sharp-tailed Sparrow
Pooecetes gramineus	Vesper Sparrow
Chondestes grammacus	Lark Sparrow
Aimophila aestivalis	Bachman's Sparrow
Junco hyemalis	Dark-eyed Junco
Spizella arborea	American Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pusilla	Field Sparrow
Zonotrichia querula	Harris's Sparrow
Zonotrichia leucophrys	White-crowned Sparrow
Zonotrichia albicollis	White-throated Sparrow
Passerella iliaca	Fox Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Melospiza georgiana	Swamp Sparrow
Melospiza melodia	Song Sparrow
Calcarius lapponicus	Lapland Longspur

Fringillidae

Coccothraustes vespertinus	Evening Grosbeak
Carpodacus purpureus	Purple Finch
Carduelis pinus	Pine Siskin
Carduelis tristis	American Goldfinch
Loxia curvirostra	Red Crossbill

Species which are extinct or extirpated in Tennessee.

Tympanuchus cupido americanus	Greater Prairie Chicken
Ectopistes migratorius	Passenger Pigeon

Conuropsis carolinensis	Carolina Parakeet

Sources: A. F. Ganier, 1933, *A Distributional List of the Birds of Tennessee*, Tennessee Department of Game and Fish; R. T. Peterson, 1980, *A Field Guide to the Birds*, Houghton Mifflin Co., Boston; Chandler Robbins, Bertel Bruun, and Herbert Zim, 1983, *A Guide to Field Identification: Birds of North America*, Golden Press, New York.

Reptiles

Chelydridae	
Chelydra serpentina	Snapping Turtle
Kinosternidae	
Sternotherus odoratus	Stinkpot
Sternotherus minor	Musk Turtle
Kinosternon subrubrum	Mud Turtle
Emydidae	
Terrapene c. carolina	Eastern Box Turtle
Graptemys geographica	Map Turtle
Graptemys pseudogeographica ouachitensis	Ouachita Map Turtle
Chrysemys scripta elegans	Red-eared Turtle
Chrysemys concinna hieroglyphica	Slider
Chrysemys picta marginata	Midland Painted Turtle
Trionychidae	
Trionyx muticus	Smooth Softshell
Trionyx spiniferus	Eastern Spiny Softshell
Iguanidae	
Anolis carolinensis	Green Anole
Sceloporus undulatus hyacinthinus	Northern Fence Lizard
Teiidae	
Cnemidophorus s. sexlineatus	Six-lined Racerunner
Scincidae	
Leiolopisma laterale	Ground Skink
Eumeces fasciatus	Five-lined Skink
Eumeces laticeps	Broad-headed Skink
Eumeces inexpectatus	Southeastern Five-lined Skink
Colubridae	
Nerodia s. sipedon	Northern Water Snake
Nerodia septemvittata	Queen Snake
Storeria dekayi wrightorum	Midland Brown Snake
Storeria occipitomaculata	Northern Red-bellied Snake

Thamnophis s. sirtalis	Eastern Garter Snake
Thamnophis sauritus sauritus	Eastern Ribbon Snake
Virginia valeriae	Smooth Earth Snake
Heterodon platyrhinos	Eastern Hognose Snake
Diadophis punctatus edwardsi	Northern Ringneck Snake
Carphophis amoenus helenae	Midwest Worm Snake
Coluber c. constrictor	Northern Black Racer
Opheodrys aestivus	Rough Green Snake
Elaphe o. obsoleta	Black Rat Snake
Elaphe g. guttata	Corn Snake
Pituophis m. melanoleucus	Northern Pine Snake
Lampropeltis getulus niger	Black Kingsnake
Lampropeltis t. triangulum	Eastern Milk Snake
Lampropeltis calligaster rhombomaculata	Mole Snake
Cemophora coccinea copei	Northern Scarlet Snake
Tantilla coronata	Southeastern Crowned Snake
Viperidae	
Agkistrodon contortrix mokasen	Northern Copperhead
Agkistrodon piscivorus leucostoma	Western Cottonmouth
Crotalus h. horridus	Timber Rattlesnake

Sources: R. Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Second Edition, Houghton Mifflin Co.

Amphibians

Cryptobranchidae	
Cryptobranchus a. alleganiensis	Hellbender
Necturidae	
Necturus maculosus	Mudpuppy
Ambystomatidae	
Ambystoma opacum	Marbled Salamander
Ambystoma texanum	Small-mouthed Salamander
Ambystoma maculatum	Spotted Salamander
Ambystoma t. tigrinum	Eastern Tiger Salamander
Salamandridae	
Notophthalmus v. viridescens	Red-spotted Newt
Plethodontidae	
Desmognathus fuscus conanti	Spotted Dusky Salamander
Desmognathus monticola	Seal Salamander
Plethodon d. dorsalis	Zigzag Salamander
Plethodon g. glutinosus	Slimy Salamander

Hemidactylium scutatum	Four-toed Salamander
Gyrinophilus p. porphyriticus	Northern Spring Salamander
Gyrinophilus palleucus	Tennessee Cave Salamander
Pseudotriton montanus diastictus	Midland Mud Salamander
Pseudotriton r. ruber	Northern Red Salamander
Eurycea b. bislineata	Northern Two-lined Salamander
Eurycea l. longicauda	Long-tailed Salamander
Eurycea lucifuga	Cave Salamander
Pelobatidae	
Scaphiopus h. holbrooki	Eastern Spadefoot Toad
Bufonidae	
Bufo americanus	American Toad
bufo woodhousei fowleri	Fowler's Toad
Hylidae	
Acris c. crepitans	Northern Cricket Frog
Hyla c. crucifer	Northern Spring Peeper
Hyla versicolor	Gray Treefrog
Pseudacris triseriata feriarum	Upland Chorus Frog
Gastrophryne carolinensis	Eastern Norrow-mouthed Toad
Ranidae	
Rana catesbeiana	Bullfrog
Rana clamitans melanota	Green Frog
Rana utricularia	Southern Leopard Frog
Rana palustris	Pickerel Frog

Sources: R. Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Second Edition, Houghton Mifflin Co., Boston.

Fish

Duck and Elk Rivers

Petromyzontidae	
Ichthyomyzon bdellium	Ohio Lamprey (E)*
Ichthyomyzon castaneus	Chestnut Lamprey (D)
Lampetra aepyptera	Least Brook Lamprey (D & E)
Polyodontidae	
Polyodon spathula	Paddlefish (E)
Lepisosteidae	
Lepisosteus oculatus	Spotted Gar (D & E)

Lepisosteus osseus	Longnose Gar (D & E)
Lepisosteus platostomus	Shortnose Gar (E)
Clupeidae	
Alosa chrysochloris	Skipjack Herring (D & E)
Dorosoma cepedianum	Gizzard Shad (D & E)
Dorosoma petenense	Threadfin Shad (D & E)
Hiodontidae	
Hiodon tergisus	Mooneye (D & E)
Salmonidae	
Salmo gairdneri +	Rainbow Trout (D & E)
Salmo trutta +	Brown Trout (E)
Esocidae	
Esox americanus	Grass Pickerel (D)
Esox niger	Chain Pickerel (D)
Cyprinidae	
Campostoma anomalum	Stoneroller (D & E)
Clinostomus funduloides	Rosyside Dace (D & E)
Cyprinus carpio *	Carp (D & E)
Hemitremia flammea	Flame Chub (D & E)
Hybopsis aestivalis	Speckled Chub (D)
Hybopsis amblops	Bigeye Chub (D & E)
Hybopsis dissimilis	Streamline Chub (D & E)
Hybopsis insignis	Blotched Chub (D & E)
Hybopsis storeriana	Silver Chub (D)
Nocomis micropogon	River Chub (E)
Nocomis effusus	Redtail Chub (D)
Notemigonus crysoleucas	Golden Shiner (D & E)
Notropis ardens	Rosefin Shiner (D)
Notropis ariommus	Popeye Shiner (D & E)
Notropis atherinoides	Emerald Shiner (D & E)
Notropis coccogenis	Warpaint Shiner (E)
Notropis blennius	River Shiner (D)
Notropis boops	Bigeye Shiner (D)
Notropis c. chrysocephalus	Striped Shiner (D)
Notropis galacturus	Whitetail Shiner (D & E)
Notropis leuciodus	Tennessee Shiner (D)
Notropis lirus	Mountain Shiner (D & E)
Notropis photogenis	Silver Shiner (D & E)
Notropis rubellus	Rosyface Shiner (D & E)
Notropis spilopterus	Spotfin Shiner (D & E)
Notropis telescopus	Telescope Shiner (D & E)
Notropis volucellus	Mimic Shiner (D & E)
Notropis sp. cf. *vollucellus*	"Sawfin Shiner" (D & E)
Notropis whipplei	Steelcolor Shiner (D & E)
Notropis wickliffi	Channel Mimic Shiner (D)

Opsopoeodus emiliae	Pugnose Minnow (D)
Phenacobius mirabilis	Suckermouth Minnow (D)
Phenacobius uranops	Stargazing Minnow (D & E)
Phoxinus erythrogaster	Southern Redbelly Dace (D & E)
Pimephales notatus	Bluntnose Minnow (D & E)
Pimephales promelas	Fathead Minnow (D & E)
Pimephales vigilax	Bullhead Minnow (D & E)
Rhinichthys atratulus	Blacknose Dace (D & E)
Semotilus atromaculatus	Creek Chub (D & E)

Catostomidae

Carpiodes carpio	River Carpsucker (D & E)
Carpiodes cyprinus	Quillback (D)
Catostomus commersoni	White Sucker (D & E)
Erimyzon oblongus	Creek Chubsucker (D & E)
Hypentilium nigricans	Northern Hogsucker (D & E)
Ictiobus bubalus	Smallmouth Buffalo (D & E)
Ictiobus cyprinellus	Bigmouth Buffalo (D & E)
Lagochila lacera	Harelip Sucker (E)
Minytrema melanops	Spotted Sucker (D & E)
Moxostoma anisurum	Silver Redhorse (D & E)
Moxostoma carinatum	River Redhorse (D & E)
Moxostoma duquesnei	Black Redhorse (D & E)
Moxostoma erythrurum	Golden Redhorse (D & E)
Moxostoma macrolepidotum breviceps	Shortnose Redhorse (D & E)

Ictaluridae

Ictalurus furcatus	Blue Catfish (E)
Ictalurus melas	Black Bullhead (D & E)
Ictalurus natalis	Yellow Bullhead (D & E)
Ictalurus punctatus	Channel Catfish (D & E)
Noturus elegans	Elegant Madtom (D)
Noturus eleutherus	Mountain Madtom (D & E)
Noturus exilis	Slender Madtom (D & E)
Noturus flavus	Stonecat (D & E)
Noturus miurus	Brindled Madtom (D)
Noturus nocturnus	Freckled Madtom (D)
Noturus stanauli	Pygmy Madtom (D)
Pylodictis olivaris	Flathead Catfish (D & E)

Amblyopsidae

Chologaster agassizi	Spring Catfish (D & E)
Typhlichthys subterraneus	Southern Cavefish (E)

Cyprinodontidae

Fundulus catenatus	Northern Studfish (D & E)
Fundulus notatus	Blackstripe Topminnow (D & E)
Fundulus olivaceus	Blackspotted Topminnow (D & E)
Fundulus julisia	Barrens Topminnow (D & E)

Poeciliidae	
Gambusia affinis	Mosquitofish (D & E)
Aphredoderidae	
Aphredoderus sayanus	Pirate Perch (D)
Percichthyidae	
Morone chrysops	White Bass (D & E)
Morone mississippiensis	Yellow Bass (D & E)
Atherinidae	
Labidesthes sicculus	Brook Silversides (D & E)
Centrarchidae	
Ambloplites rupestris	Rock Bass (D & E)
Lepomis cyanellus	Green Sunfish (D & E)
Lepomis gulosus	Warmouth (D & E)
Lepomis humilis	Orangespotted Sunfish (D & E)
Lepomis macrochirus	Bluegill (D & E)
Lepomis megalotis	Longear Sunfish (D & E)
Lepomis microlophus	Redear Sunfish (D & E)
Lepomis punctatus	Spotted Sunfish (E)
Micropterus dolomieui	Smallmouth Bass (D & E)
Micropterus punctulatus	Spotted Bass (D & E)
Micropterus salmoides	Largemouth Bass (D & E)
Pomoxis annularis	White Crappie (D & E)
Pomoxis nigromaculatus	Black Crappie (D & E)
Percidae	
Etheostoma atripinne	Cumberland Snubnose Darter (D)
Etheostoma aquali	Coppercheek Darter (D)
Etheostoma blennioides newmani	Greenside Darter (D & E)
Etheostoma blennius	Blenny Darter (D & E)
Etheostoma caeruleum	Rainbow Darter (D & E)
Etheostoma camurum	Bluebreast Darter (D & E)
Etheostoma kennicotti	Stripetail Darter (D & E)
Etheostoma chlorosomum	Bluntnose Darter (D)
Etheostoma cinereum	Ashy Darter (D & E)
Etheostoma duryi	Blackside Snubnose Darter (D & E)
Etheostoma flabellare lineolatum	Fantail Darter (D & E)
Etheostoma sp.	"Golden Snubnose Darter" (D)
Etheostoma crossopterum	Fringed Darter (D)
Etheostoma gracile	Slough Darter (D)
Etheostoma histrio	Harlequin Darter (D)
Etheostoma luteovinctum	Redband Darter (D)
Etheostoma neopterum	Lollypop Darter (D)
Etheostoma nigripinne	Blackfin Darter (D & E)
Etheostoma nigrum	Johnny Darter (D)
Etheostoma rufilineatum	Redline Darter (D & E)
Etheostoma smithi	Slabrock Darter (D)

Etheostoma spectabile	Orangethroat Darter (D)
Etheostoma stigmaeum	Speckled Darter (D)
Etheostoma jessiae	Blueside Darter (E)
Etheostoma striatulum	Striated Darter (D)
Etheostoma tippecanoe	Tippecanoe Darter (D)
Etheostoma zonale	Banded Darter (D & E)
Etheostoma simoterum	Tennessee Snubside Darter (E)
Percina burtoni	Blotchside Logperch (D)
Percina caprodes	Logperch (D & E)
Percina evides	Gilt Darter (D & E)
Percina macrocephala	Longhead Darter (D)
Percina vigil	Saddleback Darter (D)
Percina phoxocephala	Slenderhead Darter (D & E)
Percina sciera	Dusky Darter (D & E)
Percina shumardi	River Darter (D)
Stizostedion canadense	Sauger (D & E)
Stizostedion vitreum	Walleye (D & E)
Sciaenidae	
Aplodinotus grunniens	Freshwater Drum (D & E)
Cottidae	
Cottus bairdi	Mottled Sculpin (D)
Cottus carolinae	Banded Sculpin (D & E)

The following are species for which no specimens have been collected, but which are suspected to occur within the Duck River system.

Acipenseridae	
Scaphirhynchus platorhynchus	Shovelnose Sturgeon
Polyodontidae	
Polyodon spathula	Paddlefish
Lepisosteidae	
Lepisosteus platostomus	Shortnose Gar
Anguillidae	
Anguilla rostrata	American Eel
Cyprinidae	
Carassius auratus +	Goldfish
Catostomidae	
Cycleptus elongatus	Blue Sucker
Ictaluridae	
Ictalurus furcatus	Blue Catfish

Centrarchidae
Centrarchus macropterus Flier

* E = occurrence in Elk River.
D = occurrence in Duck River.

+ = introduced species.

Sources: D. L. Nieland, n.d., Fishes of the Duck River System: Preliminary Species List February 1979, on file at the University of Tennessee Ichthyology Laboratory, Knoxville, Tennessee; T. S. Jandebeur, 1972, A Study of the Fishes of the Elk River Drainage System in Tennessee and Alabama, a Masters Thesis submitted to the Department of Biology, the University of Alabama; D. A. Etnier, personal communication.

Freshwater Snails

Duck River

Viviparidae
Viviparus georgianus
Campeloma sp.

Pleuroceridae
Lithasia armigera form armigera
Lithasia armigera form duttoniana
Lithasia armigera form jayana
Lithasia geniculata form geniculata
Lithasia geniculata form fuliginosa
Lithasia geniculata form pinguis
Lithasia salebrosa
Pleurocera canaliculatum form filum
Pleurocera canaliculatum form undulatum
Pleurocera acuta
Goniobasis laqueata
Goniobasis laqueata form costulata
Goniobasis laqueata form castanea
Goniobasis edgariana
Leptoxis subglobosa
Leptoxis praerosa

Elk River

Viviparidae
Viviparus georgianus
Campeloma sp.

Pleuroceridae
Lithasia geniculata form fuliginosa
Lithasia verrucosa form verrucosa
Lithasia verrucosa form lima
Lithasia salebrosa form florentiana
Lithasia obovata form sordida
Pleurocera canaliculatum form excuratum
Goniobasis laqueata
Goniobasis edgariana
Leptoxis subglobosa
Leptoxis praerosa
Eurycaelon anthonyi

Sources: D. Bickel,, 1968, Checklist of the Mollusca of Tennessee, Sterkiana 31: 15-39; N. D. Robison, n.d., A Study of the Viviparidae and Pleuroceridae of the Duck and Elk Rivers, unpublished paper on file at the Department of Anthropology, the University of Tennessee, Knoxville.

Mussels

Duck River

Unionidae
Amblema plicata
Fusconaia barnesiana *
Quadrula cylindrica
Quadrula intermedia
Quadrula pustulosa
Quadrula quadrula
Tritigonia verrucosa
Megalonaias gigantea
Cyclonaias tuberculata
Elliptio crassidens
Elliptio dilatatus
Hemistena lata
Lexingtonia dolabelloides *
Plethobasus cooperianus
Pleurobema cordatum

Pleurobema oviforme
Alasmidonta calceolus *
Alasmidonta marginata
Pegias fabula
Anodonta grandis
Anodonta imbecillis
Lasmigona complanata
Lasmigona costata
Strophitus rugosus
Actinonaias (carinata) ligamentina
Actinonaias pectorosa *
Carunculina moesta *
Dysnomia brevidens
Dysnomia capsaeformis *
Dysnomia florentina *
Dysnomia triquetra
Ellipsaria lineolata
Lampsilis fasciola *
Lampsilis anodontoides
Lampsilis ovata
Lemiox rimosus
Leptodea fragilis
Ligumia recta
Medionidus conradicus *
Obovaria subrotundra *
Proptera alata
Truncilla donaciformis
Truncilla truncata
Villosa fabalis
Villosa iris nebulosa
Villosa taeniata *
Villosa v. vanuxemensis *
Obliquaria reflexa
Ptychobranchus fasciolare
Ptychobranchus subtentum *

* Denotes a species collected in the upper Duck River.

Elk River

Unionidae
Amblema plicata
Fusconaia cuneolus
Fusconaia edgariana *
Fusconaia barnesiana *
Fusconaia barnesiana bigbvensis *
Quadrula cylindrica *
Quadrula intermedia *

Quadrula metanevra
Quadrula pustulosa
Quadrula quadrula
Tritogonia verrucosa
Megalonaias gigantea
Cyclonaias tuberculata *
Elliptio crassidens *
Elliptio dilatatus *
Hemistena lata
Lexingtonia dolabelloides *
Lexingtonia dolabelloides conradi
Pleurobema oviforme *
Pleurobema oviforme argenteum *
Pleurobema cordatum
Alasmidonta calceolus *
Alasmidonta marginata
Pegias fabula *
Anodonta grandis
Lasmigona complanata
Lasmigona costata *
Strophitus rugosus *
Actinonaias (carinata) ligamentina *
Actinonaias pectorosa *
Carunculina moesta *
Carunculina m. cylindrella *
Dysnomia biemarginata
Dysnomia brevidens
Dysnomia capsaeformis *
Dysnomia florentina
Dysnomia haysiana
Dysnomia torulosa
Dysnomia triquetra *
Ellipsaria lineolata
Lampsilis fasciola *
Lampsilis ovata *
Lampsilis o. ventricosa *
Lemiox rimosus
Leptodea fragilis *
Medionidus conradicus *
Obovaria subrotunda *
Obovaria subrotunda lens *
Proptera alata *
Truncilla donaciformis
Truncilla truncata
Villosa fabalis
Villosa iris *
Villosa nebulosa *
Villosa taeniata *
Villosa vanuxemi *
Obliquaria reflexa

Ptychobranchus fasciolare *
Ptychobranchus subtentum *
Dromas dromus

* Denotes a species collected from the area of Tims Ford Reservoir.

Sources: B. G. Isom and P. Yokley, Jr., 1968, The Mussel Fauna of Duck River in Tennessee-1965, The American Midland Naturalist 80(1): 34-42; B. G. Isom, P. Yokley, Jr. and C. H. Gooch, 1973, Mussels of the Elk River Basin in Alabama and Tennessee-1965-1967, The American Midland Naturalist 89(2): 437-442; Steven A. Ahlstedt, 1983, The Molluscan Fauna of the Elk River in Tennessee and Alabama, American Malacological Bulletin 1:43-50.

APPENDIX B

Table B-1

Average Usable Meat Weight for Selected Animals Represented in the Owl Hollow Faunal Samples

Species	Lbs Meat Weight
Mammals	
Opossum, *Didelphis marsupialis*	8.5
Raccoon, *Procyon lotor*	17.5
Mink, *Mustela vison* +	1.0
Otter, *Lutra canadensis*	12.5
Striped Skunk, *Mephitis mephitis*	5.0
Gray Fox, *Urocyon cinereoargenteus*	4.5
Domestic Dog, *Canis familiaris* +	8.5
Cougar, *Felis concolor*	60.0
Woodchuck, *Marmota monax*	5.6
Gray Squirrel, *Sciurus carolinensis* +	0.6
Fox Squirrel, *Sciurus niger* +	1.3
Beaver, *Castor canadensis*	38.5
Muskrat, *Ondatra zibethica*	2.0
Porcupine, *Erethizon dorsatum*	10.0
Cottontail, *Sylvilagus floridanus*	1.75
Elk, *Cervus elephas*	350.0

Table B-1 (continued)

Species	Lbs Meat Weight
White-tailed Deer, *Odocoileus virginianus*	100.0
Birds	
Canada Goose, *Branta canadensis*	5.6
Ruffed Grouse, *Bonasa umbellus* +	1.0
Bobwhite, *Colinus virginianus* +	0.26
Turkey, *Meleagris gallopavo*	8.5
Sandhill Crane, *Grus canadensis* *	6.0
Passenger Pigeon, *Ectopistes migratorius* +	0.41
Mourning Dove, *Zenaida macroura*	0.20
Reptiles	
Snapping Turtle, *Chelydra serpentina* +	7.5
Box Turtle, *Terrapene carolina* +	0.4
Turtle: *Graptemys/Chrysemys* spp. +	1.5

All meat weights taken from White 1953 except where indicated.

+ Parmalee, Paul W.
1965 The Food Economy of Archaic and Woodland Peoples at the Tick Creek Cave, Missouri. *The Missouri Archaeologist* 27(1): 1-34.

* Parmalee, Paul W., Andreas A. Paloumpis, and Nancy Wilson
1972 Animals Utilized by Woodland Peoples Occupying the Apple Creek Site, Illinois. *Illinois State Museum, Reports of Investigations* Number 23.

VITA

Neil Douglas Robison was born in Peru, Indiana, on October 19, 1950. He attended elementary and junior high school in that city and was graduated from Peru High School in June 1969. The following September he entered Indiana State University at Terre Haute, Indiana. In June 1973, he was graduated cum laude with a Bachelor of Arts degree in anthropology. In the autumn of 1973 he entered the Master of Arts program in anthropology at the University of Tennessee at Knoxville. Spring quarter of 1974 he accepted an archeology teaching assistantship with the Department of Anthropology, which he retained until the summer of 1978. From the fall quarter of 1978 until the fall quarter of 1980 he was the zooarcheology teaching assistant for the Department of Anthropology. He was graduated with a Master of Arts degree in anthropology in 1977 and enrolled in the doctoral program in anthropology in the same year. In November of 1980 Neil accepted an internship with the Atlanta office of the Interagency Archeological Service of the Heritage, Conservation and Recreation Service. Since October 1981 he has been employed as an archeologist with the Mobile District, U.S. Army Corps of Engineers. Neil was graduated with a Doctor of Philosophy degree in anthropology in 1986. The author is a member of the Tennessee Anthropological Association and the Society for American Archaeology. He is married to the former Kathy Patterson of Knoxville, Tennessee.