CATCHMENT ANALYSIS OF FOUR KANSAS CITY HOPEWELL ARCHAEOLOGICAL SITES

by

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CHAPTER 1

INTRODUCTION

Statement of Purpose

The central purpose of this thesis is to examine the natural resources surrounding four Kansas City Hopewell archaeological sites in order to ascertain the potential biophysical resources exploited by the inhabitants of those sites. An understanding of the resource exploitation patterns should aid in the location of similar sites. This is done by the use of a technique referred to as site catchment analysis. Catchment is a term borrowed from geomorphology which is synonymous with a drainage basin and denotes an area from which a stream draws its water. It is referred to in this thesis as an area from which inhabitants of a site obtain their resources.

This technique gives insight about resource potential of an area and allows examination of the interactions of humans with their natural environment. Catchments are analyzed primarily upon natural resource availability and economic potential of a given area.

An assumption is that the inhabitants of these sites were willing to pay a higher price, in terms of energy expenditure, for some resources than for others. This produced what Jochim called "a hierarchy of the importance of resources" (Jochim

1976:54) and leads to variance in the use and zonation of the catchment area, and therefore, these hierarchical uses are included in this study. In addition to an examination of the potential natural resources within the study area, an evaluation of environmental, historical and cultural data is included in order to enhance the knowledge of Kansas City Hopewell resource utilization and settlement.

A second assumption is that there will be some overlapping of resources within each site's catchment. Also, each site is unique in certain aspects, and the catchment analysis will point to the site's function. Shared resources, as well as unique characteristics, have been mapped and their distributions explained.

Literature Review

Traditionally site catchment analysis has been used in archaeological research, but the inherent questions of spatial distributions of cultural phenomena, spatial analysis of resource availability and exploitation, and general land use studies are closely related to questions in human geography. The basic analysis of site catchment has precedent in economic geography. Von Thunan studied general land-use patterns which developed around "place" and the economic activities which occurred around the "place". Site catchment analysis provides a model based upon availability; abundance; spacing and seasonality of floral, faunal, and mineral resources; and aids in determining site location and function.

This study examines the resource potential for exploitation existing within a site's catchment. The analysis is done by determining the potential natural resources occurring within each site's catchment and explaining in so far as possible the effect that those resources have had upon the type, location, and function of sites. Site catchment analysis, by explaining cultural phenomena as it is influenced by economy, environment, and variations in space, can answer basic geographical questions.

The work of geographer Peter Haggett (1965) has been utilized by archaeologists when considering the locations of sites and their spatial distributions. His study of settlement systems, as seen in a regional perspective, contains a spatial element and therefore is qualified as locational analysis. This analysis concerns itself with the locations of places and correlations of these locations with other attributes of place, such as function and size (Roper 1979). Central Place Theory and gravity models have been utilized in many recent locational studies in geography. Another approach to locational analysis focuses on man-land relationships and investigates "the relationships between technology and those natural resources lying within economic range of individual sites" (Vita-Finzi and Higgs 1970:5). Site catchment analysis can help explain cultural phenomena as they are influenced by economy, environment and variations in space.

Site catchment analysis also aids in determining differences among prehistoric economies and suggests explanations for those differences. Additionally, this technique enables the data to be interpreted in a manner that aids in the explanation of the contents, functions of settlement systems associated with a particular culture, and a further understanding of demographic processes (Browman 1976; Brumfiel 1976). Although site catchment analysis was originally formulated to assess the economic potential of a particular site, or group of sites, its analysis is "an expression of an as yet implicit model for placing the settlement system of less complex societies in their spatial perspective" (Roper 1979). Six observations are made in Roper's study which summarize this idea and are basic to this thesis.

1. The biophysical environment is not uniform, either spatially or seasonally. Fish and molluscai exist only near or in water and migratory birds are only available at certain times of the year.

2. Humans are refuging animals. They move from one place to another returning to their place of origin.

3. Human beings are organized into communities.

4. The community will not use all resources available. All resources are not available for the exploitation of all communities. Some communities lack the proper technology for the attainment of certain resources. Also there is the basic idea of preference, be it either based on physical reasons or cultural phenomena.

5. Communities will tend to act in a rational manner in exploiting their natural environment. This is shown by studies of economic geography concerning the principle of least effort.

6. The process of establishing settlements over the landscape, is an adaptation of two sets of conditions, "site" and "situation." These are geographical terms defined as "The features of the local environment on which settlements are established and over which they grow" (Eschman and Marcus 1972:28), and "physical conditions relative to a site that over a wider area than the actual settlement occupies and to man's cultural characteristics within and around the city" (Eschman and Marcus 1972:28).

The term site catchment analysis was first coined in a study by C. Vita-Finzi of the Department of Geography, University College, London and the late E. S. Higgs of the Department of Archaeology and Anthropology, University of Cambridge. Their study dealt with assessing the economic potential of Upper Paleolithic and Neolithic sites in Palestine and problems related to transhumantic vs. sedentary economies. They believed that the mere existence of artifacts representative of a site was not enough to show whether the site's inhabitants practiced transhumance or were sedentary, but that "this problem must take into account not only artifacts but also the possibilities inherent in the site situations themselves" (Vita-Finzi and Higgs 1970:5).

More recent site catchment studies (Roper 1974, 1975, 1979; Browman 1976; Flannery 1976; and Rossman 1976) are concerned with assessment of resource potential of a given site, or sites, in order to determine settlement systems, relationships of sites to their environment, and the development of demographic models. Regardless of the particular questions being asked in site catchment analysis there are several common factors. The resource potential of an area exploited must be analyzed and understood. The area from where the greatest quantity of resources were derived must be determined, considering unequal seasonal and spatial distributions. Finally it is important to bear in mind that site catchment analysis was developed in order to assess exploitation of the biophysical environment, reasons for seasonal and spatial differentiations of site function, and distances that humans were willing to travel in order to exploit their environment. Site catchments' many uses and purposes are cohesive in that the fundamental technique relates site locations to resource availability and utilization within the territory surrounding a site. It works upon the premise that a given territory is of primary importance in sustaining the site's inhabitants. Such insights can be accomplished if one realizes that site catchment analysis is not an end in itself, but rather an additional technique upon which researchers can build.

Hunting and gathering has provided sustenance for more than 99 percent of human history. Only during the last ten thousand years has agriculture caused a change in human societies. And only since the Middle Woodland (Griffin 1960:4-20) has agriculture played any role in the survival of the Kansas City Hopewell. The literature suggests that the Kansas City Hopewell relied heavily, if not totally, upon wild foodstuffs obtained by hunting and gathering, with agriculture being secondary, and the topic is treated as such throughout this thesis.

Early work concerning Kansas City Hopewell (Wedel 1940, 1943, 1959) describe the Hopewellian as developing in the Illinois River Valley, specifically the Havana tradition, and slowly migrating westward to occupy the area of western Missouri and eastern Kansas near Kansas City. Although Wedel (1940, 1943, 1959) described the distribution and developments of the Kansas City Hopewell, other, more recent, work has been done on the assessment of its artifact assembledges (P. Katz 1969; Heffner 1974), activity areas (S. Katz 1974; Bell 1975), floral and faunal analyses (Roedl and Howard 1957; Brockington 1973; A. Johnson 1974; S. Katz 1974; E. Johnson 1975; and Brown 1975), soil analysis (Zabel 1976), ceramic studies (Schock 1966; Johnson and Johnson 1975), and the development of settlement-subsistence models (A. Johnson 1974).

Method

The particular method utilized in this study conforms to the traditional methods of site catchment analysis which assumes a concentric differentiation of use, or zonation of the territory surrounding a site. It is assumed that the further a settlement is located from the needed resources the more energy is expended in the procurement of those resources and that prehistoric peoples were aware of this and therefore located their sites to minimize the amount of energy expended to energy procurred. A further discussion of the method used appears in Chapter IV.

The goal of this research is to gain information on the principal types of natural resources available to the inhabitants of these four Kansas City Hopewell sites in order to further understand site type and function. Most applications of site catchment analysis have involved permanent or base settlements. This study, however, contends that it may be used in assessing economic potential and natural resource exploitation of many varied types of sites as well.

The following chapter outlines the Kansas City Hopewell area by describing the surveys of the area and a detailed discussion of the cultural sequences of the prehistoric and historic occupants of northwestern Missouri.

Chapter 3 offers a detailed discussion of the biophysical environment of the study area. This discussion gives a background on which to conduct a catchment analysis.

Chapter 4 contains a description of resource zones identified in the area, detailed site descriptions and the resulting site catchment analysis. The final chapter offers summary and conclusions of the study.

CHAPTER 2

THE KANSAS CITY HOPEWELL AREA

Surveys

Archaeological surveys in the Kansas City area for Hopewell sites were conducted as far back as 1932 by J. Mett Shippee, in 1943 by Waldo R. Wedel, and in the late 1960's by P. A. Calabrese, Alfred E. Johnson and Patricia J. O'Brien. The Little Platte River drainage containing Smithville Lake was surveyed in 1967 by Calabrese of the University of Missouri in coooeration with the National Park Service. As a result of this survey, twenty-three sites were discovered including 23CL109 and 23CI21 which were used in this study.

In 1975, O'Brien discovered eighteen new sites including 23CL199. In 1976, O'Brien resumed surveying and found fifty-three additional sites, and excavated sites 23CL109 and 23CL199. These sites represent the entire cultural sequence of this area ranging from Archaic to Historic times.

Platte County surveys and excavations began in 1943 and have continued over the years with Shippee's work. In 1971, a survey team from the University of Kansas, Museum of Anthropology, on contract with the Missouri Highway Commission, discovered forty-seven sites in the Brush Creek Valley near Parkville, Missouri, eight of which were Kansas City Hopewell, including 23PL4.

Extensive excavations have been made in the area including sessions of the Kansas Archaeological Field School: 1972, 1973, and 1975. There have been surveys and excavations continuing in this Kansas City Hopewell area since the last reported season of 1976, but none of this information has as yet been published.

Cultural Sequences

The established cultural sequences for the Kansas City area are taken from the work of A. Johnson (1974:114-115). Their designations, time sequence, and identifying characteristics follow.

1. Early Archaic - 8000 - 5000 B.C., Hardin Barbed and Agate Basin like dart points
2. Middle Archaic - 5000-2500 B.C., side notched dart points
3. Late Archaic - 2500 B.C. - A.D. 1, contracting-stemmed dart points
4. Kansas City Hopewell - A.D. 1 - 500, corner-notched dart points and sand tempered, plain-surfaced pottery
5. Late Woodland - A.D. 500-1000, corner-notched arrow points and cord-marked grit tempered pottery
6. Steed-Kisker - A.D. 1000 - 1300, side-notched arrow points and shell tempered plain-surfaced pottery
7. Historic Indian Kansa - A.D. 1500 - 1800, simple triangular arrow points, "Oneota-like" ceramics: Fanning Plain and Trailed, French, English and American trade goods
8. Euro-American - A.D. 1714 - present, "Utilatarian use of metal, especially iron, glazed ceramics, glass, religious paraphernalia of Christianity, etc."

By utilizing Johnson's criteria of a cultural sequence for the Kansas City area, a discussion of each sequence as it is known for the area will follow.

The earliest period of known habitation in this area is that of the Early Archaic. The time span of this period is from 8,000 to 5,000 B.C. These people were hunters and gatherers and were associated with the hunting of extinct fauna such as mammoth and early forms of bison. Most of their hunting camps were located on the uplands around good drainages in order to enable a good survey of the surrounding lands for game (Shippee 1964:39). From analysis of more recent surveys and excavations in the Kansas City area, however, this contention is somewhat in question. O'Brien's work on the Smithville Reservoir Project near Smithville, Missouri shows that 12 percent of the Early Archaic sites were located on the bluffs, 0 percent were located on the bluff slope and 88 percent on the valley floor. This information shows the original belief that early Archaic camps were located only on the bluffs is in error. Early Archaic hunters were utilizing not only large game but the flora and fauna located nearer the stream drainages.

The Middle Archaic spans time from 5000 B.C. to 2500 B.C. These people were also primarily hunters and gatherers but their prey were modern fauna. The sites in the Kansas City area reflect the tendency of locating sites both on bluffs and the valley floors. A total of 6 percent of known sites were located on the bluffs with the remaining 94 percent being located on the valley floor.

The Late Archaic was from 2500 B.C. to A.D. 1. The subsistence patterns of this group were similar to those of the Middle Archaic hunting and gathering, but a change in lithic style is seen. This change is perhaps in reaction to a change in the type of fauna hunted or simoly a stylistic differentiation.

The Archaic time frame 8,000 B.C. - A.D. 1 represents a change in hunting patterns from the extinct megafauna of the early time to the modern forms of local fauna. As a reaction to the changing fauna, the people inhabiting this area altered and refined thier lithic technology to benefit the hunt.

Their lithics changed from long and slender dart ooints with rounded bases, such as Agate Basin which were primarily found in association with extinct forms for bison, Bison taylori, Bison antiquus, and Bison occidentalis, to points which were marked by side and corner notching with modifications to square stemmed. These points are found throughout the middle and late Archaic in association with the modern forms of fauna, Bison bison and Odocoileus virginianus.

The Woodland Period contains two distinct groups that are recognized in the Kansas City area, the Kansas City Hopewell and the Late Woodland. The Kansas City Hopewell complex has been the most recent of the Hopewellian manifestations to be studied; following the original investigations from the Ohio and Illinois Valleys (Shetrone 1926; McGregor 1956).

Much information is available which deals with Kansas City Hopewell life. The most notable are studies by Johnson (1971), Shippee (1967, n.d.), Katz (1969), and Wedel (1943, 1959). From these works it is believed that the Kansas City Hopewell were a Middle Woodland people whose subsistence was based uoon hunting, fishing and gathering and supplemented by cultivation of corn and squash. Kansas City Hopewell was the first evidence, on the Eastern Plains, of a people whose subsistence included the growing of domestic plants (Wedel 1959). Their settlement patterns utilized river valley resources and accompanying flood-plains.

This cultural sequence represents an increased population in the area and a shift to large villages accompanied by small ancillary camps located upstream from the village base. Base settlements were located near plentiful resources which reduced the necessity of shifting large site's locations. Wedel points out that the Kansas City Hopewell occupied permanent villages as indicated by the amount of trash and midden found in these sites.

The first signs of ceramic activity occur during this time period. The ceramic tradition of the Kansas City Hopewell is well documented and is recognizable by the use of sand tempering and a transition from rocker stamping patterns during the early phase, 0-250 A.D., to plainware during the latter phase, 250-500 A.D.

The first appearance of established mortuary practices, in the form of burial mounds, also occurred during this time. Little is known of the religious traits of the Kansas City Hopewell, however, because of severe looting and vandalism of these burial mounds.

The Kansas City Hopewell cultural area was rich in wildlife at the time of the first European explorers, and specimens recovered from surveys and excavations in this area suggest that this was the case during the Kansas City Hopewell occupation as well. The question of the availability and type of fauna in this area is discussed in Chapter 3.

There are several archaeological sites in the Kansas City area which exhibit similar artifactual assemblages to the four Kansas City Hopewell sites which are the focus of this study. The Renner Site (23PL1), one of the originally identified Hopewell sites, bears a close resemblance to the Young Site. This site is located at the mouth of Line Creek near the Missouri River, eight miles downstream from Young and covers approximately six acres. It too is representative of a village. It is closely associated to the Young Site both in distance and time sequence. The Deister Site (23PL2), located on the eastern edge of Line Creek, upstream from Renner, is also of a close affiliation to Young, even though it is much smaller. Other sites in this area which exhibit similarities to these study sites are the Trowbridge Site (14WY1), located across the Missouri River in Wyandotte County, Kansas; the Aker Site (23PL43), located just upstream from Young and the Shields Site (23CL1).

The subsistence of the Kansas City Hopewell changed from primarily hunting and gathering during the early phase A.D. 1-250, to a limited dependence upon corn, marsh elder and squash horticulture from about A.D. 250 to the development of the bow and arrow around A.D. 500 (A. Johnson 1976:15). At the end of the Kansas City Hopewell phase, a "shift in the system to numerous, small, widely-spaced and shortlived occupation sites is indicated." This settlement change leads into what is known as the Late Woodland where a greater dependence upon horticulture is evident by remains of domesticated plants and evidence of slash and burn agriculture (A. Johnson 1976:15).

The Late Woodland time sequence A.D. 500-1000 is marked by a change in settlement systems which is shown by little evidence of long term residence in the known sites, as was found in the Kansas City Hopewell, because of limited quantities of cultural debris, an increased use of arrow points in the form of small corner-notched forms and the use of grit tempered, cord roughed pottery. Their subsistence economy was based upon the exploitation of wild game and flora as well as a dependence upon cultigens.

In the surveys of the Missouri River drainages it is found that most of the Late Woodland sites are located on the valley floors with some located on bluff slopes. These locations indicate a dependence primarily upon flora and fauna associated with a forested area and less upon the large herbivores which lived on the upland prairie.

The Woodland period from A.D. 1-1000 marks a change from a subsistence economy based solely upon hunting and gathering to one more dependent upon cultivation of domestic crops. During the Kansas City Hopewell phase, early forms of horticulture became apparent in the form of corn and squash pumpkins. A change in hunting occurs with evidence of the use of the bow and arrow. The development of a sophisticated ceramic tradition is seen by the changing styles of the early rocker stamping to the late plainwares. During the Woodland period the first evidence of a well defined mortuary practice is demonstrated by the many burial mounds located along the bluffs in the Kansas City area.

The Steed-Kisker unit covers a time from A.D. 1000-1300. This sequence is identified largely by shell-tempered pottery, side notched arrow points, dirt and limestone capped burial mounds, and clustered farmsteads.

The people living during this time utilized wild flora and fauna as well as domestic varieties of each. Excavations at the Richardson Hulse Site, 23CL109, have shown a heavy use of both wild and domestic flora, as was discovered in the remains of the storage pits located there.

There are more Steed-Kisker sites, that have been identified as the Kansas City area, relative to their timeframe of only 300 years, than any other cultural group in the area. Twenty-seven percent of all the sites located in the Kansas City area have been determined to be Steed-Kisker. From this large group of sites a cultural system of settlement and subsistence has been determined by Wedel (1943) and O'Brien (1976).

Research has determined that the Steed-Kisker largely subsisted upon corn, acorns, hickory, pumpkins, sunflowers, and papaws. They utilized the white tailed deer, wild turkey, various fish and the domestic dog. Their houses were similar to the prehistoric earth lodges of the Nebraska Culture located some miles north along the Missouri River drainage (Wedel 1943:210). The houses were subrectangular with four primary interior roof supports containing vestibule entrances. Apparently these peoples possessed a settlement pattern consisting of farmsteads, human burial mounds, hunting/meat processing stations and storage/plant processing sites along with "trash" sites nearby (O'Brien 1977:102-103).

This evaluation of the Steed-Kisker shows them to be a group possessing a sophisticated family structure, i.e., burial mounds and knowledge of horticulture, as demonstrated by farmsteads and partial dependence upon wild flora and fauna, which is evidenced by storage sites and hunting camps.

The next cultural sequence which occurs in the study area is that of the historic Indian, mainly the Kansa. This time period covers A.D. 1500-1800 and differs from all the previous native groups because of the intrusion and growing dependence upon European trade goods. The historic period is marked by evidence of fortified villages and increasing population. This change from strung out hamlets and lodges to fortified semi-permanent villages was a reaction to increased population pressure from migrating tribes from the east and the increased warfare which accompanied these migrations.

The historic period marks the coalescence of many prehistoric tribes into what we know now as historic tribes. During this 300 year period such tribes as the Oto, Kansa, Missouri and Osage traveled through the Kansas City area and settled for a time before moving on. A shift from sedentary agriculture to a semi-sedentary hunting way of life came with the introduction of the horse onto the plains. By the early 18th century, the Indians of the plains and surrounding areas became full fledged migratory hunters, following the buffalo and establishing temporary camps nearby. The Kansa were an example of this change in lifestyle. They had lived in Missouri during the early 18th century, but by the 19th century they migrated westward into Kansas.

With the intrusion of Europeans, both French and Spanish, began the end of the prehistoric lifestyle of these indigenous populations. The frequency of European and American trade goods increased and the knowledge of the Indian way of life decreased. Among many of the trade items which were found archaeologically and also discussed ethnographically were glass beads, woven cloth, cast iron utensils, iron and steel weaponry and firearms. By the end of the 19th century the Indians of the Kansas City area had been dispersed, having been placed upon reservations largely throughout Oklahoma and Kansas.

Chapter 3 will analyze the biophysical environment of the study area. The areas that will be outlined are geomorphology, soils, bedrock geology, Holocene bioclimates, modern climate, flora and fauna. It is necessary to outline this information in detail in order to further understand the natural resources of the area and to offer a base to build upon for future resource analysis.

CHAPTER 3

THE BIOPHYSICAL ENVIRONMENT

Geomorphology

The study area occupies portions of Clay, Clinton, and Platte counties in northwestern Missouri (Figure 1). This area is located in the Dissected Till Plains of the Central Lowlands physiographic Province (Thornbury 1965: 212-213, 226-228). Archaeologists generally refer to this area as the Northwest Prairie Region (Chapman 1975:3). Most of the study area is drained by the Little Platte River, an eastern tributary of the Platte River, in turn, a tributary to the Missouri River (Figure 2). The Little Platte River is approximately 112 miles long with a drainage area of about 1,247 square miles. Elevations in the basin range from 790 feet at its confluence with the Platte River to 1,000 feet at its headwaters. The vertical relief in the Little Platte valley is approximately 100 feet from the valley floor to the uplands. The tributaries of the Little Platte River flow in a southwesterly direction with a gradient of about 15 feet per mile. The major tributaries are Camp Branch, First Creek, Second Creek and Todd Creek.

Landforms in the study area are products of Pleistocene and Holocene events. The uplands between the river valleys are gently rolling surfaces. Approaching the larger streams, the area is more dissected. Steep bluffs border the rivers and often reveal ledges

Surface Water Resources in Study Area

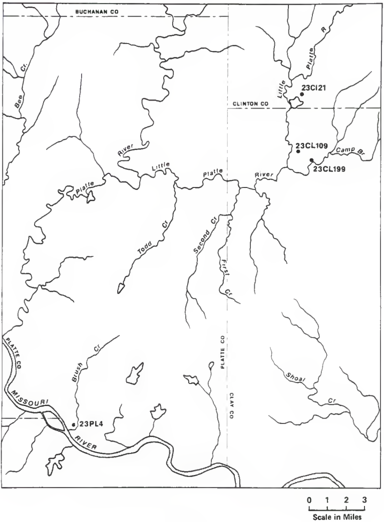
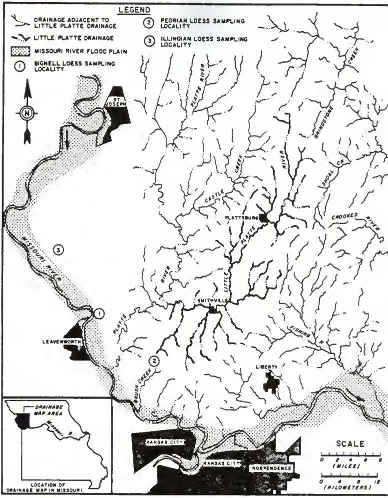


Figure 1



Source: McHugh et al.

FIGURE 2

DRAINAGE MAP OF THE LITTLE PLATTE RIVER AND VICINITY

of limestone, shale and sandstone outcrops. Deposits of loess cover the bluffs and high river terraces. The loess has been severely eroded and many streams have formed short, steep-sided valleys. The most rugged portion of the study area lies in a strip several miles wide following the Missouri River in Platte County.

Major landforms of the study area are a product of geologic events that have occurred since the beginning of the Pleistocene. These events reflect bioclimatic changes that took place in northwestern Missouri during the Quaternary. Thus, an understanding of the geomorphic history of the region is pertinent to this study.

There is no direct evidence of glaciation during the Nebraskan episode in the study area. However, Nebraskan glacial ice may have reached as far south as the Little Platte Valley since it is well documented in northeastern Kansas, southern Iowa and northwestern Missouri (Dort 1965, 1970, 1972; Bayne 1969; Howe 1968). McHugh et al. (1982:48) suggest that the major effect of Nebraskan glaciation in northwestern Missouri was to either deepen the preglacial drainage pattern and/or deposit glacial outwash in the Little Platte Valley.

The only well-documented glaciation to affect the study area was the Kansan (Hinds and Greene 1917:10; Heim and Howe 1963; Howe 1968:12-13; Bayne et al. 1971:5-6; Gardner and Donahue 1982:49) prior to about 900,000 years ago (Wollin et al. 1971:212). Kansan glaciation modified the preglacial bedrock topography by filling in valleys with glacial drift and depositing thin to thick sequences of glacial till on the uplands. As a result, the maturely dissected bedrock topography was converted into a gently rolling "till plain" (Howe and Heim 1968:18).

During retreat of the glacial ice in late Kansan time, new drainage patterns became established in northwestern Missouri. Flint (1957:409-427) suggests that the existence of a proglacial isostatic bulge during the Kansas may have locally increased north-south stream gradients at this time.

The initiation of the Missouri River, which did not exist in preglacial time, is important to this study as it forms a major base level for streams in the area. Most researchers agree that the Missouri River developed during or just after the Kansas glaciation (Hinds and Greene 1917:10; Heim and Howe 1963; Howe 1968: 12-13; Bayne et al. 1971:5-6). Davis (1955:150-151) and Schmadde (1960:20-72) suggest that the river developed in stages in northwestern Missouri, with some portions forming as an ice marginal drainage system during Kansan glaciation, and other portions, such as that between St. Joseph and Kansas City, forming subsequent to glaciation. McHugh et al. (1982:49) point out that even though Illinoian terraces are not fully recognized in the Missouri Valley, the present course of the Missouri River was probably established prior to Illinoian time since many of its tributaries have terraces which have been identified as Illinoian in age and are graded to the present Missouri Valley.

Neither Illinoian or Wisconsin glacial ice entered the study area. However, the periglacial and interglacial environments during the Middle to Late Pleistocene period were responsible for producing the geomorphic features presently observed in the river valley of northwestern Missouri (McHugh et al. 1982:53).

The major factors influencing the fluvial geomorphology of these valleys were (1) climatic and vegetational variations which controlled discharge and sediment load, and overall weathering and erosional processes in the valley, and (2) deposition of loess, which added to sediment load and covered previous landforms. McHugh et al. (Ibid.) note that river terraces are related to these events.

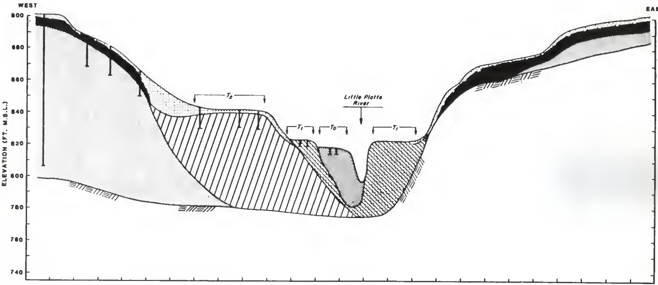
Both Illinoian and Wisconsin alluvial terraces have been identified in northwestern Missouri. The ages of the terraces have been estimated on the basis of topographic position, sediment stratigraphy, and soil profile characteristics. High terraces that are located between the upland Kansas till plain and the surface of the uppermost Wisconsin terrace are generally assigned an Illinoian age (Davis 1955:158-160; Dufford 1958:25-26; Bayne and Fent 1963:376; Jamkhinder 1967:3-4; Bayne et al. 1971:7). These terraces are severely eroded and usually occur as small remnants. An Illinoian age terrace has been identified 15 to 20 meters above the modern floodplain of the Platte River in northern Platte County (Davis 1955:103, 158). However, near the Platte's confluence with the Missouri River, the Illinoin terrace falls to 7-10 meters above the floodplain (Davis 1955). The Illinoian terrace surface is veneered by Wisconsin age loess, and in places, a well developed

Sangamon interglacial soil occurs beneath the loess (Davis 1955).

Three terraces have been identified in the Little Platte Valley and are designated T-2, T-1, and T-0 in order of decreasing age and elevation. The locations of the terraces within the valley are shown in Figure 3. Figure 3 is a generalized cross-section of the Little Platte Valley showing the major geomorphic features, including the glacial till deposits, the upland loess deposits, and the alluvial terraces.

The T-2 terrace is highly dissected and occurs as scattered remnants at elevations about 11 to 14 meters above the present T-0 and T-1 surfaces. At most localities, the T-2 is veneered with late Pleistocene loess in a fashion similar to that described by Davis (1955) for the Platte River Valley. McHugh et al. (1982: 56) suggest that the T-2 terrace formed during the Illinoian glacial episode or during the Sangamon interglacial period.

The T-1 terrace is a continuous, paired, well-defined landform. McHugh et al. (Ibid.) suggest that it formed through a combination of loessial and alluvial processes. Terrain analysis revealed that the surface of the T-1 terrace has a draped-like appearance suggesting it is covered by loess (Ibid.). Furthermore, both grain-size distribution and clay mineralogy show the T-1 sediments to be closely related to the Bignell loess. Therefore, the T-1 terrace is likely to be Wisconsin in age, and probably predates Archaic occupation.



Source: McHugh et al.

LEGEND

Glacial Till and Drift

Deep Upland Soil

T_2 Terrace Deposits

Shallow Upland Soil

T_1 Terrace Deposits

T_0 Terrace Deposits

Top of Bedrock

Data Point (Test Pit or Boring)

FIGURE 3

GENERALIZED GEOLOGIC CROSS-SECTION ACROSS THE LITTLE PLATTE RIVER VALLEY, MISSOURI

The T-0 terrace is the lowest flood plain surface in the Little Platte Valley. Analysis of the T-0 sediments suggests that this terrace is a mixture of T-1 sediments and the older upland and Kansan till soils (McHugh et al. 1982:57). The T-0 overbank deposits form levees on the loess-covered T-1 terrace, indicating that the T-0 post-dates loess deposition. A wood sample taken from a T-0 meander-scar deposit yielded a radiocarbon date of 450 +/- 150 B.P. (Ibid.). The age and relative location of the meander scar in the drainage supports the contention that the T-0 terrace is quite young and post-dates the Early Woodland cultural period (Ibid.).

There may be at least three loess deposits in the study area: the Loveland loess associated with the Illinoian glacial episode; and the Peorian and Bignell loesses associated with the Wisconsin glacial episode. Radiocarbon dates for the Peorian loess center around 22,000 B.P., while those for the Bignell bracket an 11,000 B.P. date (Dreeszen 1970:18-20). Thick sequences of Wisconsin-age loess occur throughout the study area and are clearly exposed in bluffs along the Missouri River.

Soils

The soils in the study area have recently been mapped and described by the U.S. Soil Conservation Service (see Minor and Davis 1983; USDA 1983a, USDA 1983b). An understanding of the distribution and characteristics of the soils is essential to this study because soils data were used to reconstruct the natural vegetation and to determine geographic setting in the study area. This is an important component of site catchment analysis.

Soils form when pedogenic processes act on deposited or accumulated geologic material. The characteristics of a soil at any given location are determined by the physical and mineralogical composition of the parent material, the climate under which the soil material has accumulated and existed since accumulation, the plant and animal life on and in the soil, the relief, and the length of time that the forces of soil formation have acted on the soil material (Jenny 1941: Crocker 1952). Pedogenesis is that combination of biological, physical and chemical processes by which mineral and organic materials are transformed into the distinct layers, or horizons, of soil. These processes create the morphological, chemical and physical properties of soil, which can be described and measured (Yaalon 1971).

The diversity of soils in the study area reflects the influence of several environmental factors on pedogenesis. Of primary importance is the parent materials on which soils have formed. In the study area, parent materials include (1) materials weathered from bedrock; (2) materials transported by wind (loess); (3) materials transported by water (alluvium) and gravity (colluvium); and (4) materials transported by glaciers (till).

The soil series are presented in Table 1. Detailed descriptions of the soils are provided in the recently published soil survey of Clinton County (Minor and Davis 1983) and in the preliminary soil survey of Clay and Platte Counties (USDA 1983a,b). The soil surveys also provide detailed maps showing the boundaries of the soil series in the study area.

Bedrock Geology

The bedrock of the study area is composed of relatively flat-lying, Pennsylvanian-age interbedded shales, limestones, and sandstones. These rock occur within the Shawnee, Pleasanton, Kansas City, Lansing, and Pedee groups of the Missouri series (Davis 1955:18; Burchett 197D). Except for outcrops along river bottoms and limited areas of the valley slopes of the Missouri and Little Platte Rivers, the bedrock units are covered by Pleistocene till and loess, and Quaternary alluvium. The regional dip of the bedrock is about twelve feet per mile in a west-northwest direction (Hinds and Greene 1917:9). However, minor anticlinal and synclinal structures can cause variations in the dip of bedrock strata up to 2D degrees in any direction (Ibid.).

Hinds and Greene (1917:2,1D) and Dahl (1961:44-52) have identified bedrock controls of the rivers in the study area. The Pennsylvanian limestones of northwestern Missouri tend to be resistant to fluvial erosion, while the shales are more easily eroded. It is likely that the variations in bedrock resistance have influenced the present meander form of the Little Platte River. McHugh et al. (1982:46) note that bedrock geology also

TABLE 1

Environmental Characteristics of Soil Series in the Study Area

Soil Series	Taxonomic Class	Topographic Position	Parent Material(s)	Slope	Native Vegetation
Armster	Mollic Hapludalfs	uplands	loess, pedisediment	2-25	deciduous trees, tall prairie grasses
Armstrong	Aquollic Hapludalfs	uplands	loess	5-18	mixed prairie grasses, deciduous trees
Bremer	Typic Argiaquolls	stream benches, high second bottomlands	alluvium	0-2	tall prairie grasses
Clinton	Typic Hapludalfs	uplands, high stream benches	loess	0-25	oak-hickory forests
Colo	Cumulic Hapaquolls	floodplains	alluvium	0-5	grasses
Gara	Mollic Hapudalfs	uplands	glacial till	5-40	oak-hickory forest, prairie grasses
Gasconade	Lithic Hapludolls	steep uplands	clay	2-50	native grasses
Greenton	Aquic Argiudolls	valley side, slopes	loess, shales, limestones	2-25	tall prairie grasses
Ladoga	Mollic Hapludalfs	uplands, high stream benches	loess	0-30	oak-hickory forest, tall prairie grasses

TABLE 1 (continued)

Soil Series	Taxonomic Class	Topographic Position	Parent Material(s)	Slope	Native Vegetation
Lagonda	Aquic Argiudolls	ridgetops, side slopes	loess	2-15	tall prairie grasses
Lamoni	Aquic Argiudolls	uplands	paleosol	5-18	tall prairie grasses
Macksburg	Aquic Argiudolls	ridgetops, upland divides	loess	0-5	tall prairie grasses
Moniteau	Typic Ochraqualfs	level stream terraces	silty alluvium	0-3	mixed hardwoods
Nevin	Aquic Argiudolls	low stream benches	silty alluvium	0-5	tall prairie grasses
Nodaway	Mollic Udifluvents	floodplains	alluvium	0-3	forests, mixed grasses
Sharpsburg	Tupic Argiudolls	uplands, high stream terraces	loess	0-18	tall prairie grasses
Snead	Aquic Hapludolls	upland side slopes, slopes	shales, limestone	2-20	tall prairie grasses
Vanmeter	Typic Eutrochrepts	uplands	residuum	14-60	deciduous forests
Wiota	Typic Arguiudolls	stream benches	silty alluvium	0-5	tall prairie grasses

plays an important role in the location of nickpoints (e.g., rapids, waterfalls, constrictions in valley floors). Nickpoints are areas where rivers are often easily forded and provide a source of lithic materials when thick soil deposits cover most of the bedrock in the valley.

Bedrock in the study area provided good quality stone for tool manufacture. Johnson (1974:108) notes that outcrops of limestone, sandstone, and shale in the lower reach of Brush Creek were quarried by prehistoric occupants of the valley. Cherts of the Kansas City and Shawnee groups, particularly the Plattsmouth limestone of the latter group, provided suitable raw material for the manufacture of stone tools (Davis 1955:18). The chert resources of the three-county area are Spring Hill, Argentine, Westerville, and Winterset. Spring Hill chert is greenish-grey and is very fossiliferous. O'Brien (1977:44,66) notes that Spring Hill chert appears in thirty-three percent of the chipped stone from sites 23CL109 and 23CL199. Argentine chert closely resembles Westerville as both are light brown to buff and cream in color. However, they differ in texture. Argentine is smooth and Westerville is matted. Argentine chert is not identified as being the resource for any of the chipped stone tools from sites 23CL109 and 23CL199. In contrast, Westerville chert represents forty-three percent of the chipped stone from these two sites. Winterset chert is dark grey to black with white banding and is very smooth in texture. Westerville appears in twenty-four percent of the chipped stone from the two sites (Ibid.).

Holocene Bioclimates

This section is not intended to reconstruct the Holocene paleo-environments of the study area; such a task is beyond the scope of this work. The major point is to offer some discussion of possible differences and similarities between the environmental conditions existing during the Kansas City Hopewell occupation (0-500 A.D.) and the present.

Climatic interpretation of an area is achieved by considering the areal extent of moisture conditions and climatic history. This is indicated by changes in the elevation and extension of bodies of water, by deposition, erosion and soil formation. It is realized that in the discussion of climatic change that those changes must be global and synchronous and they may occur rapidly. Bryson (1967, 1970) argues that "significant ecological effects can occur in just a few decades" and that the over-simplified climatic sequence of Antevs (1948, 1952, 1955), which suggests the use of slowly rising temperatures reaching a peak about 7000 - 5000 B.P. followed by a decline culminating at the present, be replaced by modified Blytt-Sernader episodes. These episodes suggest, instead a step-like climatic variation and ecological response which is a reponse to basic global climatic changes. Tables 2 and 3 illustrate these climatic models.

These discussions on the reliability of paleoclimatic understanding suggests that there are many problems within this area. There are disagreements as to which technique is more accurate and

TABLE 2

Two Models for Post-Glacial Climatic Change

Antevs (1955) Episode	Antevs (1955) Tentative Date B.P.	Bryson et al. (1967; 1970) Episode	Bryson et al. (1967; 1970) Tentative Date B.P.
	----------1		----------1
		Recent	
			----------120
		Non-Boreal	
			----------420
		Pacific	
			----------770
		Neo-Atlantic	
Medithermal			
			----------1070
	----------4000	Scandic	
			----------1700
		Sub-Atlantic	
			----------2900
		Sub-Boreal	
			----------4700
Altithermal		Atlantic	
			----------8450
	----------7500	Boreal	
			----------9650
		Pre-Boreal	
Anathermal			
			----------10500
	----------10,000	Late Glacial	

TABLE 3

Oetailed Regional Climatic Models

Bryson et al. (1970)			Antevs (1955)
A.O. 1960			
A.O. 1B50	Recent		
A.O. 1550	Neo-Boreal		
A.O. 1450	Pacific II		
A.O. 1200	Pacific I		
A.O. 900	Neo-Atlantic		Medithermal
A.O. 270	Scandic		
		SUB-ATLANTIC	
930 B.C.	Sub-Atlantic		
		SUB-BOREAL	Altithermal
2720 B.C.	Sub-Boreal		
4020 B.C.	Atlantic IV		
5090 B.C.	Atlantic III	ATLANTIC	
5770 B.C.	Atlantic II		Anathermal
6490 B.C.	Atlantic I		
71B0 B.C.	Boreal II	BOREAL	
7690 B.C.	Boreal I		
		PRE-BOREAL	
B540 B.C.	Pre-Boreal		
9040 B.C.	Stadial	LATE GLACIAL	
	Two Creekan Interstadial		

reliable. All of this points out that there very well may be errors in the hypothetical reconstruction of the environment of the Kansas City Hopewell time period 0-500 A.D., but that the known facts concerning the climate of this time are usable for this work.

The study area's climate falls within Borchert's (1950:2) Prairie Zone, an area of grassland extending into the deciduous forest regions of the east. This climate has been dominant in the area for thousands of years but has oscillations which can be readily recognized (Bryson and Wendland 1967).

The period 0-500 A.D. can be placed within the Sub-Atlantic climatic episode (Bryson and Wendland 1966). During this episode, 550 B.C. - A.D. 400, the northern United States was much wetter, the Southwest became drier and the midwest experienced cooler weather and more precipitation. The Sub-Atlantic episode does not represent a large variation from the climate of today, at least in this particular area, so it will be assumed that the present environment does not differ significantly from the climate of the Kansas City Hopewell occupation.

There has been work done to reconstruct the climate of the Kansas City Hopewell occupation by using floral and faunal data. The analyses completed by Adair (1977) suggest that by reconstructing the flora from storage pits located at the Young site, a fair apprxoimation of climate could be obtained. E. Johnson (1975) shows that by studying growth lines of mammal molars and also the types and availability of flora, that a close approximation of the climate in the Kansas City area from 0-500 A.D. can be accurately obtained. In all of the work done on the reconstruction of this climate it is suggested that there was actually very little difference in the climate of the study area of 2000 years ago and that which is in existence today. The fact that the flora identified through analysis of the excavated sites corresponds with the flora available in the area today and that all of the animals, except those which have been eliminated from the area because of cultural influences, exist today, suggests similar climates and environments.

Modern Climate

Missouri lies in the zone of the prevailing westerlies. Cyclonic frontal cells associated with invading Pacific air masses are largely responsible for the short-term (daily and weekly) changes that affect weather. The weather patterns are basically those described by Borchert (1950) for his Climatic Region IV, the wedge-shaped midcontinent area of tall grass prairie, often called the Prairie Peninsula. The major characteristics for the region are: 1) low winter rainfall and snowfall; 2) occasional summer droughts with a tendency for major summer droughts to occur synchronously within the region; 3) a continental source and trajectory of the mean air-stream which blankets the region during dry periods, and 4) dominance of moist maritime trooical (mT) air from the Gulf of Mexico during the summer.

The study area has a C-2 moist subhumid climate (Thornwaite 1948) with a moisture surplus index of 0-20. This continental type climate is characterized by a large annual temperature range and extremes in precipitation. The winters are usually short and cold and the summers are long and hot. The mean annual temperature for a 28 year record (1951-1979) at Kansas City, Missouri is 56.2 F. In winter the average temperature is 33 F., and the average daily minimum temperature is 24 F. The average summer temperature is 78 F., and the average daily maximum temperature is 88 F. Descriptive summaries for the Kansas City, Missouri weather station show January and July as the coldest and warmest months, respectively (Table 4).

The mean annual precipitation for a 28 year period (1951-1979) at Kansas City, Missouri is 35.75 inches. Of this, 25 inches, or 70 percent, usually falls in April through September (Table 4). This period of maximum precipitation is largely a result of cyclonic activity. Maritime polar (mP) and continental polar (cP) air masses that flow into eastern Missouri during the late spring and early summer usually converge with warm, moist maritime tropical (mT) air that is flowing north from the Gulf of Mexico. The overrunning of mP and cP air by warmer mT air often produces intense rainfalls of short duration along the zone of convergence. Convectional thunderstorms in the summer months also produce heavy rainfalls.

TABLE 4

Temperature and Precipitation Data[1]

	Temperature (F^o)			Precipitation (")	
Month	Average Daily Maximum	Average Daily Minimum	Average	Average	Average Snowfall
January	37.8	19.8	28.8	1.17	6.9
February	43.5	25.1	34.3	1.28	4.1
March	52.7	32.8	42.8	2.51	5.1
April	66.6	45.7	56.2	3.34	0.7
May	76.6	56.8	66.7	4.12	0.0
June	85.0	66.3	75.7	5.18	0.0
July	89.2	70.8	80.0	4.42	0.0
August	88.5	69.2	78.9	3.69	0.0
September	81.2	60.7	71.0	4.08	0.0
October	70.3	49.5	59.9	3.02	0.0
November	54.8	35.9	45.4	1.56	0.9
December	42.8	26.2	34.5	1.38	4.5
Yearly	65.8	46.4	56.2	35.75	22.2

[1]Data were recorded in the period 1951-1979 at Kansas City, Missouri.

Source: U.S. Soil Conservation Service, Department of Agriculture, unpublished records.

Winter is a relatively dry period in western Missouri. Precipitation generally averages between 1.0 and 1.5 inches per month during this season. The mean annual snowfall for the Snowfall is greatest in January and March, with monthly averages of 6.9 inches and 5.1 inches respectively (Table 4).

Severe, long-term droughts in western Missouri can have tremendous ecological effects on ecotones. Since droughts tend to favor grasses over arboreal species, there is a tendency for a forest-prairie border, such as the one in the region, to shift, with grassland expanding and contracting in response to the fluctuating climate (McMillan 1976a:20).

Flora

The natural vegetation of the study area are tall grass prairies and oak-hickory forests. The most prevalent of the tall grasses are bluestems, with big bluestem Andropogon gerardi, and small bluestem Andropogon scoparius, comprising the largest percentage. Indian grass Sorghastrum nutans and switchgrass Panicum virgatum also comprise much of the prairie vegetation. The oak-hickory forests are broadleaf deciduous and are comprised largely of white oak Quercus alba, red oak Quercus rubra, black oak Quercus veluntina, bitternut hickory Carya cordiformis, and shagbark hickory Carya ovata.

There were many different vegetational resources in the area that could have been utilized by the inhabitants of the study sites. These resources would have become available at varying times throughout the year, so as to allow for eight months of harvesting. Appendix A lists the various edible species found in this area, their locations, edible parts and their months of availability.

Those plants that produced edible resources in the spring included food bearing trees such as the Elm, Box Elder and Maple; the herbaceous plants, wild ginger, Jack-in-the-pulpit, watercress and the May apple; and woody plants such as smooth sumac.

Summer vegetation was abundant for harvesting. The edible parts of the food-bearing trees were cambium from the Ash, fruit from the Cherry and Mulberry, and seeds from the Black locust. Herbaceous plants harvestable during the summer were Sweet cicely, Pokeberry, Wild strawberry and the Ground plum.

Autumn brought forth abundant resources in the form of berries from the Hackberry, acorns from the Black, White, Red and Burr oaks, seeds from the coffee tree, pods from the Honey locust, seeds from the Goosefoot, Pinkweed and Marsh elder and rhizomes from Soloman's seal and the Sensitive fern.

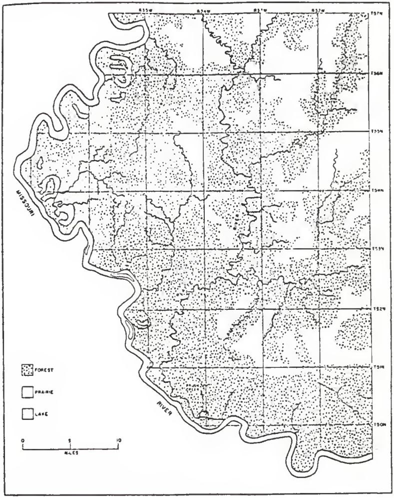
Sap extraction from Maples and box elder occurred in early spring (March and April). Small plants, bark and tubers, were available throughout the spring into early summer. Late summer through fall harvesting of berries and fruits, acorns, and a variety of nuts was common. By harvesting of plants throughout their cycles, and the careful storing through the winter (November - February), the inhabitants of this area could sustain a varied and nutritious diet.

Early land surveyor's notes (1840's) describe the vegetation of the area as being predominantly oak-hickory forests, and the 1842 map by Hutawa and Hutawa (Figure 4) shows the oredominance of these forests. Figure 5 presents the land surveyors map of the area.

It was shown by A. Johnson (1974), through a study assessing the amount of change in vegetation since the 1840 land survey that 75 percent of the woody plants existing today also existed in the area at the time of the land survey. This shows there has been little alteration of the natural vegetation during the last 140 years. In addition, studies of Kansas City Hopewell sites, Young 23PL4 and Trowbridge 14WY1, indicate both prairie and forest vegetation species were utilized by their inhabitants and that the same species are still available in northeastern Missouri today. The same species that were available in the past are currently available today, however, there has been a great reduction in the variety of species because of urbanization and agriculture.

Fauna

The fauna existing in an area were determined to a large extent by environmental conditions, especially vegetation. In transitional zones there is often an overlapping of species in the "edge" communities. This results in increased numbers of species in these areas.



Source: Missouri Historical Society.

Figure 4
HUTAWA LAND SURVEY: 1840

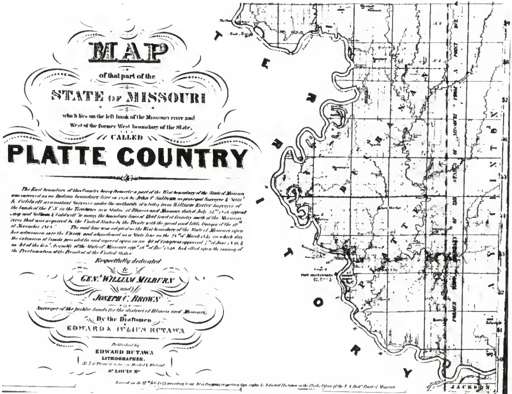


FIGURE 5
Land Survey of Platte County, Missouri 1846

Faunal resources of the study area include those that roamed the upland grasslands: bison, elk, gray wolf, coyote and badger, those which inhabited the forest: black bear, raccoon, squirrel and deer, and those which were aquatic: turtle, muskrat, mink, various fishes, as well as migratory birds.

The larger herbivores and other mammals accounted for the greatest amount of protein and skins per kill. Smaller animals and aquatic species were important as well. Appendices B through E outline, in detail, the fauna of the area and their habitats.

The fauna which existed from 0-500 A.D. were similar to those of today and suggest like environments. Many species have been reduced or completely eliminated within the area (bison, elk, wolf, Trumpeter swan) due to urban or agricultural development during the last 100 to 150 years.

The area has a considerable variety of both floral and faunal resources economically useful to man. Because of the potential of summer drought,one season might or might not bring expected rainfall and subsequent plant and animal availability. Any exploitative pattern had to have possessed the flexibility of alternate responses. A successful subsistence exploitation can only be achieved by careful management of available resources. The inhabitants of the Kansas City Hopewell area would have had to have been aware of subtle variations in their environment to successfully exploit and occupy the area over a long period of time.

Chapter IV is a discussion of the biophysical resource zones which are located in the study area, a description of the four Kansas City Hopewell sites, and the resulting catchment analysis of those four sites.

CHAPTER 4

CATCHMENT ANALYSIS

This chapter will describe five biophysical resource zones which are found in the area of northeastern Missouri. Their morphology, floral content and faunal inhabitants are identified and discussed for the purpose of identifying the important economic resources and their locations relative to the four Kansas City Hopewell sites.

This chapter also will describe the four sites which were chōsen for site catchment analysis. They represent four different site types within the region. The sites are 23PL4, the Young site, 23CL109, the Richardson Hulse site, 23CL199, the Yeo site,and 23CL21, the Clinton site.

The final section of this chapter will deal with the catchment analysis of the four Hopewell sites. Included in this section will be maps indicating the resource zones which have been identified within each catchment area.

Resource Zones

Five resource zones are described in detail as to their morphology, floral contents and faunal inhabitants. The following section discusses these zones.

1. Bottomland Prairie
2. Upland Prairie
3. Oak-Hickory Forest
4. Bottomland Forest
5. Aquatic

Bottomland Prairie: This zone occurs in old meanders above current day floodolains or in or around poorly drained sorings. The grasses that occur on the upland prairie also are evident in the bottomland prairie environment along with some instances of marsh grasses. Many of the locally available edible floral resources are abundant in the bottomland prairie. This is true for the various tubers, roots and seeds such as Jerusalem artichoke, wild onion and Marsh Elder, which were available seasonally.

The primary fauna found in the bottomland prairie were the white tailed deer and raccoon. Various small rodents also inhabited these areas. The birds most common to this zone were Hawks, (Accipiter sp) (Buteo sp) (Falco sp), Golden Eagle (Aquila chrysaetos) and the Bald Eagle (Haliaetus leucocephalus).

Upland Prairie: This is an area which is largely treeless with the predominant vegetation being bluestem grasses, Andropogon Gerardi and A. scoparius; Indian grass, Sorghastrum nutans, Switchgrass, Panicum virgatum, and wild rye, Elymus canadensis. Although there have been few studies describing this area as being important for vegetal resources, Reid (1975) suggests that these resources have not been thoroughly studied for their importance to and use by prehistoric peoples. Such identified vegetal resources found in this area are elderberry and hazelnut, sunflower, wild strawberry, prairie clover and a host of other edible plants (Appendix A).

Another role that the upland prairie served, in terms of prehistoric economies, is an optimal area for the grazing of bison and elk, and a natural habitat for such animals as coyote, cottontail, jackrabbit, and skunk (Appendix B).

Oak-Hickory Forest: The oak-hickory forest is located near tributary streams and on the bluff tops and hillsides. It is a closed canopy forest with white oak (Quercus alba), red oak (Quercus rubra) and shagbark hickory (Carya ovata) being the primary timber.

Other prominent species of trees in this zone were bitternut hickory (Carya cordi formis), black oak (Quercus veluntina) and hazelnut (Corylus americana). Based upon Alfred E. Johnson's work in the Brush Creek valley of southern Platte County, the existing forests account for seventy-five percent (75%) of the aboreal species noted in 1840 land surveyors' notes (A. Johnson 1974:109-114). Johnson states that any differences occurring between modern sampling and the 1840 land survey is due to sampling biases and do not indicate any significant changes in the forest vegetation over the last 130 years (Ibid.: 111). It is most likely that the oak-hickory forest was the largest zone within Brush Creek at the time of the Kansas City Hopewell. Consequently, this becomes even more pertinent to the analysis. Harvestable foods obtained from these species included mostly acorn and seeds (Appendix A).

Herbaceous plants occurring in this zone include the wild strawberry (Fragoria virginianum), may apple (Podophyllum peltatum) and the Missouri gooseberry (Ribes missouriense), among others (Appendix A). Resources which were harvestable in this zone were generally limited to tubers and fruits.

The faunal resources in this area were abundant. Many of the species were large and capable of providing many resources to their hunters. The most prevalent were the black bear (Euarctos americanus), white tailed deer (Odocoileus virginianus), elk (Cervus canadensis), and mountain lion (Felis concolor). Many other smaller mammals were at home in this community and reflect utilization by man (Aopendix B).

The prominent birds in the zone were the wild turkey (Meleagris gallopara) and various grouse.

Bottomland Forest: This zone consists of species which can withstand periodic flooding as they are located near floodplains, riparian forests bordering streams, and the narrow areas which parallel the base of bluffs. The primary trees found here were ash (Fraxinun so), black oak (Quercus veluntina), burr oak (Quercus macrocarpa) and maple (Acer sp). These trees yielded acorns, nuts and sao which were edible.

The herbaceous plants that occurred are, among others, Jack-in-the-pulpit (Arisaema tiphyllum), may apple (Podophyllum peltatum) and pokeberry (Slytolacca americana) (Appendix A).

Faunal resources of this area consisted of many of the same that occur in the oak-hickory forests except the coyote (Canis altrans), grey fox (Urocyon cinereoargenteus) and the red fox (Vulpes fulva) among others (Appendix B).

Birds which inhabited this zone were the prairie chicken (Tympanuchus cupido), ruffed grouse (Bonasa umbellus) and the sharp-tailed grouse (Pedioecetes phasianellus).

Aquatic: The wetlands provided for an abundance of species of vegetation. Aboreal species include ash (Fraxinus sp), mulberry (Morus rubra) and hackberry (Celtis occidentalis). From these trees came cambium, fruits and berries (Appendix A).

The river banks provided good location for such herbaceous species as Amaranthus, Chenopodium and Rorippa. These plants yielded seeds, corms and fruits (Appendix A). Other vegetation which inhabited this zone were cat-tails (Typha sp) and bullrushes (Scirpus sp). These occurred in low lying areas of constant standing water.

Aquatic fauna consisted of beaver (Castor canadensis), mink (Mustila vison) and muskrat (Ondatra sibethicus).

Migrating birds were numerous in this zone with several species of ducks, geese and heron accounting for the majority of fowl (Appendix E).

It should be pointed out that these resource zones described above are generalizations. Specific zones will occur with varying frequency in major categories. In other words, outcrops of oak-hickory forests may occur in prairie zones and vice-versa. These occurrences do not adversely affect the outcome of the catchment analysis. A generalized illustration of biogeographic resource zones appears as Figure 6, and fauna important to the resource zones appear in Table 6.

Each of these resource zones provided the Hopewell oopulations with vegetal foods and animals. Each zone yielded various foods in different seasons of the year (Appendix A).

Site Descriptions

The Young Site 23PL4. The Young site is located along the Missouri River Valley drainage, near the mouth of Brush Creek approximately one-half mile above its confluence with the Missouri River. It is situated on the second terrace of the Missouri River five miles west of Parkville, Missouri. The legal description is SW 1/4 of Section 30, Township 51 North, Range 34 West in Platte County, Missouri. Geographic coordinates of the site are 94^{o} 45' 40" W, 39^{o} 11' 50" N. The total area for the Young site is slightly over 30 acres, with the Kansas City Hopewell component covering over four. The remainder of the site consists of Steed-Kisker (a Mississippian complex dating from A.D. 1000 - 1300) materials.

BIOGEOGRAPHIC RESOURCES BY RESOURCE ZONE

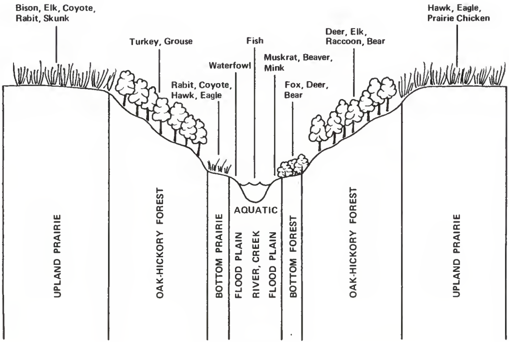


Figure 5

TABLE 5

Economically Important Faunal Resources by Resource Zone

Aquatic:	Bottomland Prairie:
Beaver	Deer
Mink	Rabbit
Muskrat	Raccoon
Duck	Hawk
Geese	Golden Eagle
Heron	
Fish	Upland Prairie:
	Bison
Bottomland Forest:	Elk
	Coyote
Grey Fox	Rabbit
Red Fox	Skunk
Deer	Hawk
Elk	Golden Eagle
Black Bear	Prairie Chicken
Oak-Hickory Forest:	
Deer	
Raccoon	
Elk	
Mountain Lion	
Black Bear	
Wild Turkey	
Grouse	

The associated ceramic dates, as well as C-14 dates, suggest an occupation of the Hopewell component from A.D. 1-500. A storage pit seriation was done on 29 pits based upon work done by Johnson and Johnson in 1975. The dates obtained by this seriation fall within a range from A.D. 300 to 450, suggesting a short lived occupation while the radiocarbon dates range from 100 B.C. to A.D. 610 (+60 - 75). The differences in these occupations suggest that more radiocarbon dates are needed along with a more complete seriation.

The identification of Kansas City Hopewell occupation was largely done by stylistic dating of the ceramic materials representative of early, middle and late Kansas City Hopewell complexes. Included in this study was the identification of characteristics common to the Kansas City Hopewell. Several which were numerous at Young were large corner and side notched darts, plain sandtempered pottery featuring rocker stamping and crosshatching on the rims, and numerous rounded end scrapers and bifacially worked tools.

Extensive surveys of the Young site were the result of a Missouri Highway Commission Contract awarded to the University of Kansas, Museum of Anthropology in 1971 to survey for prehistoric remains along a proposed segment of Interstate 435. First mention was made of the Young site by Wedel (1943), but no excavations were conducted until the field season of 1971. During the summer of 1971, University of Kansas and Kansas State University archaeological teams began excavations and completed thirty-six 2 x 2 meter squares. These excavations continued throughout the summers of 1972, 1973 and 1975. After the excavations were completed a total of 29 trash filled storage pits of the Kansas City Hopewell were identified. These pits were used originally for storage of food-stuffs and later filled with debris. It was from the remains of these storage pits that significant inference was made as to the time sequence of their occupation and use, and to the type of site that Young represented.

The trash-filled pits from the Young site were seriated using 38 rim sherds obtained from the 1971-1973 field seasons. These 38 rims were uncovered from eleven pits. Two pits were used for radiocarbon sampling based on a half life of 5730:

N-1179	2050+ - 110	100 B.C.		Feature 3
CWR-180	1340+ - 60-75	A.D.	610+60-75	Feature 40

The seriation of the rim sherds suggests a shorter span of occupation than do the radiocarbon dates, but most of the mean projection scores fall within a range of A.D. 300-450.

The Richardson Hulse Site 23CL109. The Richardson Hulse site is located in a cultivated field along the floodplain of the Little Platte River which flows approximately 1/2 mile west and 1 mile south. It is approximately one mile southwest of the town of Paradise, Missouri. It is situated on a large knoll and covers an area of about 2000' x 800'. Its legal description is SW 1/4 of the NE 1/4 of Section 7, Township 53N, Range 32W in Clay County, Missouri. The site's geographic coordinates are 94^{o} 30' W, 39^{o} 30' N, and is located at 840 feet above sea level and 30 feet above the Little Platte River.

The site was first recorded by Pangborn in March, 1967 and tested by Riley and Moore in June. The cultural components manifested in this site range from Early Archaic, 6000 B.C. to 19th century Historic peoples.

The Early Archaic occupation was represented by 2 Hardin Barbed points which suggest transient hunting activities. The Middle Archaic was the greatest Archaic occupation. The Nebo Hill complex is represented by 14 points, 2 drills, 2 gouges, 3/4 grooved axes and several manos and metates. All of this suggests hunting, gathering and woodworking activities. Late Archaic occupation is represented by 2 Gary points which indicate limited hunting. Also associated with the Archaic sequence in one hafted side notched blade, a drill and manos and metates.

The Kansas City Hopewell culture occupied this site during the late Hopewell sequence as is evidenced by ceramics and projectiles. The artifacts assigned to Kansas City Hopewell were 88 plain-surfaced body sherds and 4 rims. The lithics totaled 4: one large dart, one small point and two end scrapers. These artifacts indicate this site was a "unifunctional" hunting camp and "its location on a knoll overlooking the Little Platte River and nearness to an excellent natural spring would make it a natural area for game to collect" (O'Brien 1977:83).

Late Woodland occupation is indicated by ceramic and lithic artifacts. There appears to be seventy-four items representing this time period. They are grit tempered and are both cord roughened and plain. The lithic are represented by two corner notched arrow points, one of which is assigned to the Scallorn type.

The Steed-Kisker artifacts identified consisted of assorted chipped stone tools and one shell tempered bead. There were eight triangular arrow points assigned to this cultural sequence, two drills, and ten end scrapers.

Radiocarbon dates indicated excavated storage pits which belonged to the Steed-Kisker component. The dates were all clustered around A.D. 1100 through A.D. 1200.

Due to the multi-cultural components of this site, there were several artifacts which were not assigned to a specific cultural group, as they were unidentifiable. Various chipped stone artifacts, rounded and square basal shaped bifaces, gouges, blades, drills, end and side scrapers, and assorted worker chert debris were found throughout the site. Hammerstones, manos, metates, anvils, axes, and abraders were found in abundance, and a good many of them were not assigned to any specific cultural group. These tool types are difficult, and often impossible, to assign to a grouping which can be specifically identified. The existence of these various artifact types points to the fact that there was a reported ancient occupation of this site, and that it was favorable for diverse uses by many different peoples throughout time. The lack of sub-surface features (pits, hearths and houses) suggest the site was only temporarily used by these many ancient peoples.

The Yeo Site 23CL199. The Yeo site is located on a flood-plain of Camp Branch, a tributary of the Little Platte River. Its legal description is NW 1/4 of the NW 1/4 of the NW 1/4 of Section 16, Township 53N, Range 32W. The site is located at 830-840 feet above sea level and covers 800 square meters of very level topography. Its geographical coordinates are 94^{o} 30'35" W, 39^{o} 24'3"N and its nearest neighbor is Paradise, Missouri, 1 1/4 miles to the northwest. Yeo was to be completely inundated by Smithville Reservoir and therefore was surveyed and excavated extensively. The site was surveyed during June 1975 and excavated during the summer of 1976 by crews from Kansas State University and the University of Kansas.

There were thirteen 2 meter squares opened during the field season, and three cuts made by a 12' grader. Five storage pits were discovered as a result of the grader cuts. They were located roughly six meters from each other, forming an oval shape. Most all the artifacts taken from this site were located in these six pits.

The largest group of artifacts consistently were ceramics. One-hundred and four (104) sand tempered body sherds were extracted from the features, eighty-six (86) sherds were from the blade cuts, and ninety-five (95) from the general excavations. Ten body sherds were sand tempered, nine from the features were sand and grog tempered, while the two complete vessels and fifteen body sherds were grog tempered. There were eight rim sherds: six sand tempered, one sand/grog and one grog tempered. The dispersal of the eight rims was fairly consistent with the other ceramic materials. One was from Feature 1, one from the surface, three from the grader cut and three from the excavated squares.

The lithics from this site were not prolific. There were twelve points total, five from the surface survey, one from Feature 5, one complete point from the south cut, and the remaining five from the excavated squares. Of the twelve points, three were complete, five represented tips, one middle section and three bases. Only two had been heat treated.

There were eight bifaces, four of which were whole, two tips and two mid-sections. One of these was from Feature 5, five from the south cuts and two from the squares. Four of these had been heat treated.

Four end scraoers were found, one from Feature 5, one from the south cut, one from the north cut and the last from the surface. None of these had been heat treated. One other scraper was identified as a possible side scraper.

There were two possible drill bases, one from Feature 5 and the other from an excavated square. Both were unheated. Three spokeshaves were found, one from Feature 5 and the other two from excavated squares. Thirteen worked chert fragments were from excavated squares. There was only one fragment which was from chert not native to the Kansas City area. Two-hundred and seventeen (217) fragments of chert debris were found throughout the site. The predominant chert utilized was Springhill and Westerville, both of which are native to the area and appear readily in many outcroppings.

Assorted groundstone artifacts were prolific throughout this site. This supports the belief that this was a unifunctional plant storage site.

There were twenty-six hammerstones which displayed six distinct shapes. They were present throughout the site. Half of them, however, were uncovered in the southern most blade cut, where most all artifacts were found. Three were from Features 2 and 3, one from the north cut and the remainder scattered in various pits. Six pitted hammerstones were discovered--four from the south cut and two from excavated pits. Three stones show battering marks on their edges and a depression on a smooth side. These are speculated to have been used as anvils.

Manos are represented by six types defined by shape differences. Nineteen manos were identified--twelve were from the south cut, two from the north cut, two from the center cut, one from the surface, one from Feature 5 and one from a pit. There was a total of four incomplete fragments--one from the center cut and three from the south cut. Four metate fragments were found, one from the north cut and two from excavated squares.

Thirty-five hammerstone fragments were found throughout the entire site -- sixteen from the grader cuts, one from Feature 2 and eighteen from the excavated squares. Thirteen abrading tools were identified. They were placed into three types based upon surface differences. There were five flat abraded surface tools and eight awl abraders with V shaped grooves. One possible abrader is tentatively identified.

Several miscellaneous materials were scattered throughout the site. Although individually these materials mean little, when viewed together within the site's total context, an important indication of site function is realized.

There were five possible bone tools. Three were possible awls from Features 2, 3, and 4, an awl tip from Feature 3, and either an awl or beamer fragment came from the south cut.

Identifiable faunal material came largely from Features 1, 2, 4, and 5. Feature 1 yielded a coyote molar. Feature 2 contained two possible box turtle bones, one fish scale, one left mandable of a deer, one certain box turtle and one river otter humerus. Feature 4 yielded only one deer tooth, and Feature 5 had one probable deer rib and one deer phalange. The south cut yielded an occipital and atlas vertebrae representing a deer, and square 10N 8W/2, had one left tibia of a deer.

There were four hundred (400) unidentifiable bone fragments, most probably mammal. All of the faunal remains represented animal life that was native to the environment of the Kansas City area and would have been available at the time of the site's occupation, i.e., Late Kansas City Hopewell, A.D. 0-500.

Analysis of this material suggests that the Yeo site was a unifunctional storage site used for seasonal plant collection and storage. This is supported by the evidence of large quantities of nutting tools, pitted hammerstones and grinding tools in the form of manos and metates. The limited amount of lithic and faunal materials indicates the occupants of 23CL199 utilized this site seasonally for storage and collection of foodstuffs, primarily wild hickory nuts, and marsh elder with some amaranth and chenopodium seeds.

This occupation by Late Kansas City Hopewell peoples conforms to the model proposed by Dr. Alfred Johnson (1976:14) of small specialized function sites located as ancillary support to the general settlement pattern of Kansas City Hopewell.

The radiocarbon dates were determined by the University of Georgia from samples of wood charcoal, and are shown in Table 6.

TABLE 6

UGA-1449	Feature 2	1850 +/- 100	A.D. 100
UGA-1450	Feature 1	915 +/- 165	A.D. 1035
UGA-1452	Feature 4	1020 +/- 295	A.D. 930
UGA-1453	South Dozer	1185 +/- 65	A.D. 765

Although the nearest dates to late Kansas City Hopewell occupation that can be established are 135 - 370 years later than the last identified Kansas City Hopewell date of A.D. 500, the artifact assembleges support this late Kansas City Hopewell occupation. It is suggested that these dates represent relationships between Late Woodland and Kansas City Hopewell that is yet to be established and understood (O'Brien:1977).

The Clinton Site 23CI21. The Clinton site is a multicomponent site which spans time from the Early Archaic to the Steed-Kisker. It was originally reported by J. Mett Shippee in 1971 and was surveyed by the Kansas State University team during the summer of 1975.

The site is located in Clinton county and it's legal description is SW 1/4 of the NW 1/4 of the SE 1/4, Section 20, Township 54N, Range 32W. It's longitude is 94^{o} 31' W, latitude 39^{o} 28' 15" N with a mean sea level of 940 feet. This site is approximately one-half mile northeast of the Trimble Wildlife Management Area.

Early Archaic Thebes points and Late Archaic Gary and Lantry points are present. Also present are points from the Kansas City Hopewell, Late Woodland and Steed-Kisker traditions. No pottery has ever been found by the landowner on this bluff top site, though the points of three pottery making complexes are present. Given its location, the site may have been a lookout site associated with migrating waterfowl on their flyover of this part of the Little Platte River. "If so, this site would have been a perfect lookout for such game, and it potentially may be a specialized, limited activity site, specifically a Spring/Fall hunting camp." (O'Brien 1977:24).

Catchment Analysis

Catchment analysis was carried out on the four Kansas City Hopewell sites using these resource zones as guidelines. The analysis results are displayed in Figures 7 through 10 and Table 7.

In order to assess the Kansas City Hopewell catchments, site catchment analysis was performed according to Donna Roper's technique as follows:

> The use of the technique enables the investigator to study the resource potential of a territory surrounding a site and to assess its potential for providing necessary resources with maximum efficiency in procurement. The technique consists of determining the amount of area covered by the various resource zones within an arbitrarily determined circular territory surrounding each site and thus immediately accessible to the site's inhabitants (Roper 1974:1).

The figures illustrate the resource zones found within the three mile catchments delineated for each site. The tables show the entire catchment area for each site or what Vita-Finzi and Higgs (1970) referred to as the "exploitation territory" and also the restricted exploitation territory, or each one-mile zone.

The majority of economic activity occurs within the first one mile radii because of close proximity and less energy expenditure.

Catchment Area - Site 23PL4

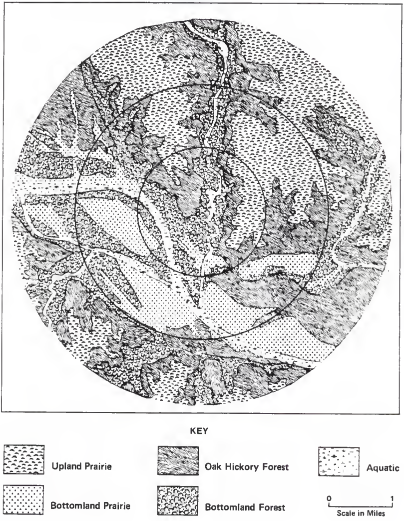


Figure 7

Catchment Area - Site 23CL109

KEY

Upland Prairie

Oak Hickory Forest

Aquatic

Bottomland Prairia

Bottomland Forest

0 1
Scale in Miles

Figure 8

Catchment Area - Site 23CL199

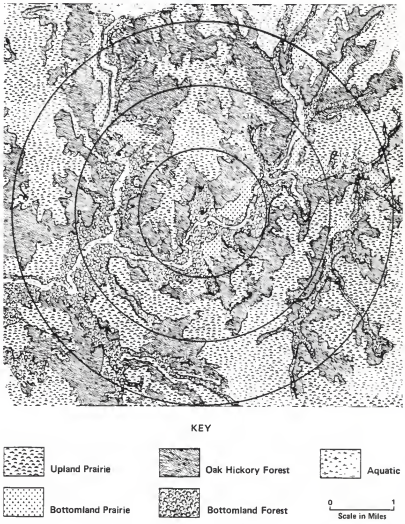
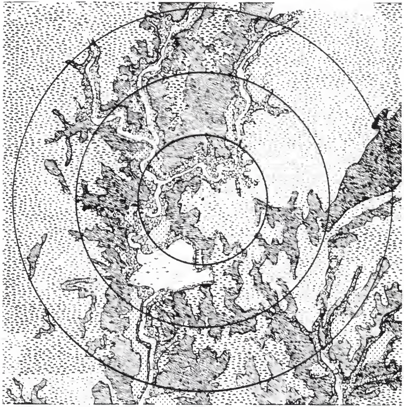


Figure 9

Catchment Area - Site 23CI21



KEY

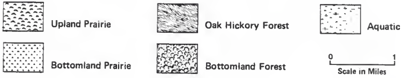


Figure 10

TABLE 7

Percentage of Resource Zones Within

Each Site's Catchment

	23PL4	23CL109	23CL199	23CI21
One Mile:				
Aquatic	12%	8%	5%	6%
Bottomland Forest	37%	24%	23%	4%
Oak-Hickory Forest	26%	48%	46%	40%
Bottomland Prairie	8%	8%	9%	5%
Upland Prairie	17%	12%	17%	45%
Two Miles:				
Aquatic	8%	5%	6%	8%
Bottomland Forest	20%	17%	20%	26%
Oak-Hickory Forest	27%	39%	48%	29%
Bottomland Prairie	26%	3%	3%	4%
Upland Prairie	19%	36%	23%	33%
Three Miles:				
Aquatic	8%	7%	2%	3%
Bottomland Forest	21%	18%	17%	7%
Oak-Hickory Forest	41%	27%	39%	20%
Bottomland Prairie	6%	4%	2%	2%
Upland Prairie	24%	44%	40%	68%

This however, is by no means an unbreakable rule. It must be remembered that site catchment analysis is a general and not a specific indicator of a site's resource potential and function.

The maps that indicate the catchments of each site were developed by isolating and measuring separate resource zones within each exploitation territory,and generalizing the economic potential of each resource zone. The actual construction of the maps included the following methods:

1. Elevation of the study area was mapped.
2. A detailed soil map was overlain on the elevation map. The major soil series were recorded.
3. A generalized vegetation map was constructed from these detailed soil maps.
4. Vegetation data from 1819 and 1840 land surveys were compared with the generalized vegetation map.
5. A detailed resource zone map was developed and was the final result.

Catchments of each site were determined from this detailed resource zone map. However, the various features represented on the catchment maps are not precise replications of the actual landscape, but general indicators of the catchment area around a site. This lack of precision was unavoidable due to the nature of the map construction, i.e., several map sources. It is felt, however, that the detailed appearance of these catchment maps does not detract from the analysis of the resource zones identified by this method because of the manner of their construction.

Four steps were taken in constructing and analyzing the exploitation territory. They are as follows:

1. Estimate exploitation territory into a unit--one mile radii
2. Estimate separate resource zones occurring within each unit--determine the percentage of each zone by using a dot overlay
3. Establish a generalized estimate of economic potential of each zone--detailed explanation of the resource potential within each identified zone
4. Generate approximations of economic potential of the entire exploitation territory--discuss site type and function occurring within each area.

Method

The first step in this analysis is assigning designates of three radii, spaced equally one mile apart, around each of the four study sites. The area within each of these one mile resource zones is then measured. The steps included in completing these measurements must include noting soil type, mapping ground slope and the presence of lithic outcroppings, assessment of vegetation and fauna from the area, and mapping water resources and drainage patterns. Information which will serve as background material to this analysis includes climatic data, geologic and basic physiographic information, as well as a discussion of the paleoenvironment of the area.

After compiling this information,the catchment analysis was completed with the aid of topographic maps, existing land use and soil maps, and references to any known prehistoric land use information obtained through archaeological or paleoecological analysis.

When the catchment area was evaluated, a series of graphs and maps were used to demonstrate the extent of the site's catchment, its surrounding resource zones, and the prehistoric and contemporary land use. In order to evaluate the data, the area of each resource zone was measured.

There are problems with using the "concentric" approach. First, the use of equally spaced concentric circles is viewed as theoretically inferior because they do not take into consideration the topographic variability of an area. The use of circles is popular,providing a constant measurement even though the use of arbitrary time contours is believed to yield more accurate data in terms of actual "exploitation territory." This actual exploitation territory is derived from the time contours that model a territory to a site's topography. Second, exploitation territories are only best estimates of where most of the critical economic resources available to a site's inhabitants will occur. The concentric circles only approximate the catchment area.

Finally, catchment analysis offers only a generalized notion of a site's economic potential. It does not specifically detail the actual potential of a given site. Given these criticisms of the "concentric circle" approach of site catchment analysis, this researcher still chose to employ the method because of the ease of measurement and mapping, the maintenance of those measurements, the use of the technique in much of American literature, and the relative uncomplicated nature of this research.

In summary, the four Kansas City Hopewell catchments occur in three primary resource zones: a) oak-hickory forest, b) upland prairie and c) bottomland forest. Two distinct functional site types are recognized from these data. The first represents seasonally occupied sites. Three sites were used for specialized activity, primarily hunting and storage. The other site, a village, involved several activities and was inhabited during all four seasons.

These two different site types, representing distinct activities, have been established. The following discussion relates these site types to economic behavior by discussing the principal types of resource zones and resources available to the inhabitants of each site.

Three circles with radii of one mile were centered around these sites. The area, measured by percentage of each resource zone, was calculated using a dot overlay.

Based upon the environmental discussion in Chapter 3, and the outlining of the five resource zones in this chapter, the generalized economic potential for each site is as follows.

The Richardson Hulse Site 23CL109. The one mile area surrounding this site is primarily oak-hickory and bottomland forest, accounting for 72 percent of the resource areas. Upland prairie, bottomland prairie and aquatic zones are almost equally distributed.

The two mile area reflects an increase in upland prairie and a slight decrease in bottomland forest and oak-hickory forests to 56 percent. The bottomland prairie and aquatic also decreased in percentage of total.

The area within the three mile radii shows an increasing amount of upland prairie (44 percent) and a continued decrease in bottomland and oak-hickory forest (45 percent). The remaining two zones maintain approximately the same status.

The Yeo Site 23CL199. The one mile radii consists of predominately oak-hickory and bottomland forest (69%). Upland prairie consists of 17 percent, and bottomland prairie and aquatic 14 percent.

The two mile radii shows the same amount of oak-hickory and bottomland forest (68%), but an increasing percentage of upland prairie (23%). The remaining two zones consist of only 9 percent.

The area in the three mile radii shows a decline in the percentage of oak-hickory and bottomland forest (56%), and a significant increase to 40 percent the upland prairie zone. The two remaining areas accounted for only 4 percent of the total area.

The previous two sites are very similar in their catchments. Their catchments are characterized by oak-hickory and bottomland forest dominance (especially 23CL199), with a secondary importance being upland prairie. Bottomland prairie and aquatic zones show a decrease in appearance as the catchments expand outward from the sites.

The Clinton Site 23CI21. This site shows a somewhat different catchment. The area within the one mile radii includes primarily upland prairie and oak-hickory forest (88%). The remaining three resource zones equally account for 12 percent (Table 7).

The two mile radii shows a dramatic increase in bottomland forest (26%) and decreases in oak-hickory forest and upland prairie (62%). The remaining two zones account for 12 percent.

The three mile catchment changes even more. Upland prairie dominates with 68 percent, oak-hickory forest consists of 20 percent, and the three remaining resource zones make up 12 percent. The one mile and three mile catchments of this site are very similar and the two mile catchment shows a more even distribution among upland prairie, oak-hickory forest and bottomland forest.

Still, the predominant resource zone making up this site's catchment is upland prairie with oak-hickory forest being of secondary importance. This is very different from the first two sites, 23CL109 and 23CL199 where oak-hickory and bottomland forest dominated.

The establishment of two separate catchment types based upon their resource zone allows the speculation of possible site function and resource exploitation differences. Interpreting this analysis is at best hypothetical, but does offer some possible insight into these sites functional differences.

Sites 23CL109 and 23CL199 are generally situated to exploit the resources of the oak-hickory forest and the bottomland forest closest to the site. There is an increasing importance of the upland prairie zone further away from the sites.

The faunal resources within these site's primary catchment are deer, elk, mountain lion, and bear; all large and capable of supplying large quantities of meat and hide. The floral resources show carying seasonability, with much opportunity for harvesting adequate foodstuffs during three seasons out of the year. These resource zones of oak-hickory and bottomland forest provided the greatest diversity of woody and herbaceous plant foods. These foods are available from March through November. The dominant resources of spring are sap and tubers, and nut and acorns are common in the fall.

The resources within these sites secondary catchment area (upland prairie) consist of bison and elk, but also contain smaller mammals; rabbit, and skunk, as well as many birds; eagle, hawk and prairie chicken. The vegetal resources are of less abundance within this resource zone, i.e., tubers, nuts and berries. This resource zone is not representative of great opportunity for edible floral resources. "The upland prairie represents a vegetation resource zone of little potential importance to prehistoric plant-food collecting economies ... there are no large scale, efficiently harvestable natural crops in the upland prairie zone" (Zawacki and Hausfater, 1969).

Site 23CI21 is characterized by a greater extent of upland prairie, with oak-hickory forest being of secondary representation. The faunal resources of this area are bison, elk, rabbit, coyote, hawk and eagle. Also of some consequence is the slight increase in the aquatic and bottomland forests zones within the 2 mile catchment area. These zones include such resources as fox, deer, fish and waterfowl.

The importance of the faunal and floral resources of the oak-hickory zone appear to be of secondary consideration because of the decreasing representation of this zone as compared to the total.

The two similar sites, 23CL109 and 23CL199, are situated to exploit oak-hickory and bottomland forest. However, they are located within catchment range of upland prairie. These sites could represent small semi-permanent residences exploiting several resource zones in close proximity. They may also be seasonal sites with special function status, such as plant and nut storage, hunting camp, etc. These site functions would take a population from resource to resource following seasonal changes of resources.

Site 23CI21 very well may have been utilized on a seasonal round. The location of the site, with its primary resource zones being upland prairie, does not suggest a site which would be inhabited year round, because of the apparent lack of harvestable natural crops. Instead the idea that this was a seasonal fly-over site which provided its inhabitants with waterfowl on their semi-annual migrations, and a seasonal hunting camp, seems to have some credence. The fact that bottomland forest and aquatic resource zones increase in importance within the second catchment suggests this as a possible explanation.

The seasonal round utilization of these sites would support the model that Kansas City Hopewell established specialized function sites on a seasonal basis to support the larger village settlements, such as Young.

<u>The Young Site 23PL4.</u> The area within the first mile radii is primarily bottomland forest and oak-hickory forest, accounting for 63 percent of the resource area. Upland prairie and aquatic areas are of secondary significance with 29 percent of the area and bottomland prairie accounting for only 8 percent.

The two mile catchment demonstrates a fairly even distribution of oak-hickory (27%), bottomland prairie (26%), and bottomland forest (20%) for a total of 73 percent. Bottomland prairie increased considerably (18%) and bottomland forest decreased by 17 percent. Upland prairie remained relatively static whereas the aquatic zone decreased slightly (4%) (Table 7).

The catchment within the three mile radii showed an increase in oak-hickory (14%) and a static bottomland forest. Upland prairie increased 5 percent and bottomland prairie decreased considerably (20%). Aquatic habitat remained the same.

Aquatic resources appear to be of slightly greater predominance around this site. The amount of aquatic resource zone holds around 10 percent for all three mile catchments. This is to be expected because of the site's close proximity to the Missouri River.

The most predominant resource zone in all three mile catchments is oak-hickory, which accounts for nearly 33 percent of the total resource zones. The second, and closely associated, is bottomland forest which makes up 26 percent of the total area. Upland prairie accounts for 20 percent, and bottomland prairie accounts for 13 percent.

From this analysis it appears that oak-hickory and bottomland forest (59 percent of total) present themselves as most prevalent. The resources within this site's primary catchment are those that would provide large quantities of meat and hide. The flora offers opportunity for three seasons of harvesting. These two resource zones provide a great diversity of both plant and animal foodstuffs throughout the year.

The upland prairie zone provides opportunity for faunal resources, both large and small, but lesser availability of floral resources (as notes on page 76).

The slight increase of bottomland prairie and aquatic zones suggest an opportunity to access a slightly different resource (smaller animals, birds and fish) than is available at the other three sites.

The Young site's resource zones are very similar to 23CL109 and 23CL199, suggesting similar exploitation patterns with the only difference appearing to be in the relatively static importance of the aquatic zone, which is not the case at the other sites. With the importance of the varied resources provided by the oak-hickory and bottomland forests, and the specialized resources provided by the aquatic zone, the statement that this was a larger, more oermanent site is supported.

CHAPTER 5

SUMMARY AND CONCLUSIONS

Summary of Results

It has been the primary goal of this thesis to examine the natural resources surrounding four Kansas City Hopewell archaeological sites in order to ascertain the potential biophysical resources exploited by the inhabitants of those sites. The understanding of the exploitation of these resources should aid in the location of similar sites and in the overall understanding of the settlement system of the Kansas City Hopewell.

From this analysis it was determined that the four Kansas City Hopewell sites were located in three primary resource zones:

1) Oak-Hickory Forest,

2) Upland Prairie, and

3) Bottomland Forest.

From this data two distinct site types were recognized, (1) seasonal ancillary camps and 2) permanent village.

The two seasonal sites, Hulse, 23CL109 and Yeo, 23CL199, were located near resources available in the oak-hickory and bottomland forest. This would have provided the occupants with countless floral resources harvestable during three seasons and a great many animals for meat and clothing.

The Clinton site, 23CI21, was located primarily in the upland prairie resource zone and represents a slightly different choice for resources. There would have been more of an availability of both large and small game and less of an availability of harvestable flora.

The Young site, 23PL4, a village, was located in an area of diverse resource potential. The two most dominant resource zones were the oak-hickory and bottomland forest. This is similar to the Hulse and Yeo sites, but with a subtle difference being the aquatic zone, which seems to be static in its proximity to the Young site. This would permit an exploitation of more diversified resources than the other sites.

This study has accomplished most of what it was intended to but not all. The use of site catchment analysis to analyze the resource potential of these four Kansas City Hopewell catchments was useful, and yielded interesting information about the resource potential of sites thought to have occupied different positions, and demonstrate different functions within a settlement system. It was useful in examining and quantifying the nature of a territory immediately accessible to the inhabitants of these four Kansas City Hopewell sites.

There were many potential research problems that the site catchment analysis could have been extended to include:

1) estimate site productivity,

2) estimate site production,

3) determine site locations, and

4) determine site spacings.

However, for this research the use of site catchment analysis was aimed at determining the resource potential of each site's catchment by determining the natural resources available to the site's inhabitants.

From analyzing these resources it appears that there were more similarities in the resources surrounding these four sites, and that the varying degree to which the resources were able to provision the site's occupants suggests different site type and function. The use of site catchment analysis has, for the sake of this study, been useful in determining the resources available to a group of people existing as a part of a certain settlement system, and by using the concepts of man-land relationships, determine how they directly influenced site location, settlement systems, and resource exploitation. Site catchment analysis has offered another approach in explaining the interaction between humans and their environment.

APPENDICES

APPENDIX A

EDIBLE FLORAL SPECIES OF THE KANSAS CITY HOPEWELL AREA

EDIBLE FLORAL SPECIES OF THE KANSAS CITY HOPEWELL AREA

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
Missouri River Floodplain			
Trees:			
Ash	*Fraxinus sp.*	cambium	July, August
Black locust	*Robinia pseudocacia*	seeds	August
Honey locust	*Gleditsia triancanthos*	pods	September, October
Box elder	*Acer negundo*	sap	March, April
Black oak	*Quercus veluntina*	acorns	September, October
Red oak	*Quercus rubra*	acorns	September, October
White oak	*Quercus alba*	acorns	September, October
Coffee tree	*Gymnocladus dioica*	seeds	September, October
Elm	*Ulmus sp.*	cambium	March, April
Hackberry	*Celtis occidentatlis*	berries	September-November
Maple	*Acer sp.*	sap, bark	March, April
Mulberry	*Morus rubra*	fruit	June, July, August
Herbaceous plants:			
Cleavers	*Galium aparine*	seeds, sprouts	April - July
Goosefoot	*Chenopodium album*	seeds, sprouts	May, September-October
Jack-in-the-pulpit	*Arisaema tiphyllum*	tubers	April, May
John's cabbage	*Hydrophyllum virginicanum*	leaves	June
May apple	*Podophyllum peltatum*	fruit	April, May
Pink weed	*Polygonum pennsylvanicum*	seeds	August - November
Pokeberry	*Plytolacca americana*	leaves, stalks	June - November
Spring beauty	*Claytonia virginica*	corms	April - May
Watercress	*Rorippa sp.*	plant	April - November

APPENDIX A (CONTINUED)

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
Tributary Floodplain Forest			
Trees:			
Ash	*Fraxinum sp.*	cambium	July, August
Black oak	*Quercus veluntina*	acorns	September, October
Burr oak	*Quercus macrocarpa*	acorns	August, September
White oak	*Quercus alba*	acorns	September, October
Black walnut	*Juglans nigra*	nuts	September, October
Cherry	*Prunus serotina*	fruit	July - September
Elm	*Ulmus sp.*	cambium	March, April
Hackberry	*Celtis occidentalis*	berries	September - November
Hickory	*Carya sp.*	nuts	October, November
Maple	*Acer sp.*	sap, bark	March, April
Mulberry	*Morus rubra*	fruit	June - August
Pin oak	*Quercus palistris*	acorns	September, October
Red oak	*Quercus rubra*	acorns	September, October
Herbaceous Plants:			
Cleavers	*Galium aparine*	seeds, sprouts	April - July
Goosefoot	*Chenopodium album*	seeds, sprouts	May, September-October
John's cabbage	*Hydrophyllum virginicanum*	leaves	June
May apple	*Podophyllum peltatum*	fruit	April, May
Pokeberry	*Plytolacca americana*	leaves, stalks	June - November
Spring beauty	*Claytonia virginica*	corms	April, May
Watercress	*Rorippa sp.*	plant	April - November

APPENDIX A (CONTINUED)

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
<u>Slope-Upland Forest</u>			
Trees:			
Ash	*Fraxinum sp.*	cambium	July, August
Black locust	*Robinia pseudocacia*	seeds	August
Honey locust	*Gleditsia triancanthos*	pods	September, October
Black oak	*Quercus veluntina*	acorns	September, October
Black jack oak	*Quercus marylandica*	acorns	September, October
Burr oak	*Quercus macrocarpa*	acorns	August, September
Pin oak	*Quercus palustris*	acorns	September, October
Post oak	*Quercus rumor*	acorns	September, October
Red oak	*Quercus rubra*	acorns	September, October
White oak	*Quercus alba*	acorns	September, October
Black walnut	*Juglans nigra*	nuts	September, October
Cherry	*Prunus serotina*	fruit	July - September
Coffee tree	*Gymnocladus dioicia*	seeds	September, October
Elm	*Ulmus sp.*	cambium	March, April
Hackberrv	*Celtis occidentalis*	berries	September - November
Hickory	*Carya sp.*	nuts	October, November
Maple	*Acer sp.*	sap, bark	March, April
Mulberry	*Morus rubra*	fruit	June - August
Herbaceous plants:			
Aster	*Aster sp.*	leaves	August - October
Cleavers	*Galium aparine*	seeds, sprouts	April - July
Columbine	*Aquilegia canadensis*	roots	May
Common milkweed	*Asclepius syriaca*	shoots, buds, pods	April - September

APPENDIX A (CONTINUED)

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
Herbaceous plants (cont'd)			
False solomon's seal	*Smilacina racemosa*	berries, roots	August, September
Ground cherry	*Physalis pubescens*	fruit	August, September
Hog peanut	*Amphicarpa bracteata*	beans	September, October
John's cabbage	*Hydrophyllum virginianum*	leaves, plants	June
May apple	*Podophyllum peltatum*	fruit	Aoril, May
Merrybells	*Uvularia grandiflora*	rhizomes, shoots	August, September
Pepper root	*Dentaria laciniata*	tuber	April, May
Pokeberry	*Phytolacca maericana*	leaves, stalks	June - November
Prairie clover	*Petalosteum purpureum*	roots	April - July
Sensitive fern	*Onoclea sensibilus*	rhizomes	August - October
Spring beauty	*Claytonia virginica*	corms	April, May
Squirrel corn	*Dicentra canadensis*	tuber	April, May
Solomon's seal	*Polygonotum sp.*	rhizomes	September, October
Sweet cicely	*Osmorhrea claytoni*	roots	June, July
White dog tooth violet	*Erythronium album*	bulbs	April, May
Wild ginger	*Asarum reflexum*	roots, rhizomes	April, May
Wild strawberry	*Fragaria virginianum*	fruit	June, July
Upland Prairie			
Woody plants:			
Elderberry	*Sambucus canadensis*	berries	June - August
Hazelnut	*Carylus americana*	nuts	September, October
Smooth sumac	*Rhus glabra*	shoots, fruit	May - July

APPENDIX A (CONTINUED)

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
Herbaceous plants:			
Butterfly-weed	*Asclepius tuberosa*	shoots, tubers, pods	April - June
Common milkweed	*Asclepius syriaca*	shoots, buds, pods	April - September
Love grass	*Eragrostus sp.*	seeds	August - October
Prairie clover	*Petalosteum purpureum*	roots	April - July
Prairie turnip	*Psoralea esculenta*	taproot	June, July
Sunflower	*Helianthus sp.*	seeds	September - November
Wild strawberry	*Fragaria virginiana*	fruit	June, July
Yellow oxtails	*Oxalis structa*	roots, flowers	April - September
Floodplain Prairie			
Herbaceous plants:			
Blue vervain	*Verbata hastat*	seeds	August - October
Ground cherry	*Physalis sp.*	fruit	August - October
Ground plum	*Astragulus crazz icarpin*	fruit	June - November
Jerusalem artichoke	*Helianthus tuberosus*	tuber	August - October
Lamb's quarters	*Chenopodium album*	seeds	September, October
Marsh elder	*Eva ciliata*	seeds	September - November
Common milkweed	*Asclepium syriaca*	shoots, buds, pods	April - September
Pigweed	*Amaranthus sp.*	seeds	September - October
Pink weed	*Polygonum pennsylvanicum*	seeds	August - November

APPENDIX A (CONTINUED)

Vernacular Name	Scientific Name	Edible Part	Months Harvestable
Herbaceous plants (con'td)			
Sedge	*Carex sp.*	stems, tubers	July - September
Sunflower	*Helianthus sp.*	seeds	September - November
Wild bean	*Strophestyles missouriansis*	fruit	September, October
Wild onion	*Alium mutabile*	root	April - July

Sources: Steyermark, J. A., Flora of Missouri. The Iowa State University Press, Ames, Iowa, 1963.

APPENDIX B

MODERN MAMMALIAN FAUNA NATIVE TO THE STUDY AREA AND HABITATS

MODERN MAMMALIAN FAUNA NATIVE TO THE STUDY AREA AND HABITATS

Vernacular	Scientific	Habitats				
		Prairie	Bottomland Prairie	Oak-Hickory Forest	Bottomland Forest	Aquatic
@ Badger	*Taxidea taxus*	X				
* Beaver	*Castor canadensis*					X
@ Bison	*Bison bison*	X				
@ Black Bear	*Euarctos americanus*			X	X	
Bobcat	*Lynx rufus*			X	X	
Eastern Chipmunk	*Tamias striatus*			X		
Coyote	*Canis latrans*	X		X		
White-tailed Deer	*Odocoileus virginianus*		X	X	X	
@ Elk	*Cervus canadensis*			X	X	
Gray Fox	*Urocyon cinereoargenteus*			X		
Red Fox	*Vulpes fulva*			X		
Plains pocket Gopher	*Geomys bursarius*	X				
@ Mountain Lion	*Felis concolor*			X	X	
Southern Bog Lemming	*Symptomys cooperi*		X		X	
Mink	*Mustela vison*				X	X
Eastern Mole	*Scalopus aquaticus*	X				
Fulvous Harvest Mouse	*Reithrodontomys fulvescens*	X	X			
Western Harvest Mouse	*Reithrodontomys megalotis*	X				
Pine Mouse	*Microtus pinetorum*			X		
Prairie White-footed Mouse	*Peromyscus maniculatus*	X				
Woodland White-footed Mouse	*Paromyscus leucopus*			X	X	

APPENDIX B (CONTINUED)

Vernacular	Scientific	Habitats				
		Prairie	Bottomland Prairie	Oak-Hickory Forest	Bottomland Forest	Aquatic
Opossum	*Didelphis marsupialis*			X	X	
Meadow Jumping Mouse	*Zapus hudsonium*		X		X	
Muskrat	*Ondatra sibethicus*					X
Raccoon	*Procoyon lotor*		X	X	X	
Black-tailed Jack Rabbit	*Lepus californicus*	X				
Eastern Cottontail	*Sylvilagus floridanus*	X				
Common Cotton Rat	*Sigmodon hispidus*	X				
Eastern Wood Rat	*Neotoma floridana*			X	X	
Least Shrew	*Cryptotis parva*	X				
Short Tailed Shrew	*Blarina brevioauda*			X	X	
Spotted Skunk	*Spilogale putorium*	X				
Striped Skunk	*Mephitis mephitis*			X	X	
Eastern Fox Squirrel	*Sciurus niger*			X	X	
Eastern Gray Squirrel	*Sciurus carolinensis*			X	X	
Southern Flying Squirrel	*Glaucomys volans*			X	X	
Thirteen-lined Ground Squirrel	*Citellus tridecemlineatus*	X				
@ Meadow Vole	*Microtus pennsylvanicus*		X			
Prairie Vole	*Microtus ochrogaster*	X				
Long-tailed Weasel	*Mustela frenata*	X		X	X	
@ Gray Wolf	*Canis lupus*			X	X	
Woodchuck	*Marmota monax*			X	X	

APPENDIX B (CONTINUED)

@ Extirpated species

* Extirpated, reintroduced

X Habitat

Sources: Schwartz, C. W. and Schwartz, E. R. The Wild Mammals of Missouri. University of Missouri Press, Columbia, Missouri, 1959.

APPENDIX C

MODERN AMPHIBIAN AND REPTILIAN FAUNA NATIVE TO THE STUDY AREA

MODERN AMPHIBIAN AND REPTILIAN

FAUNA NATIVE TO THE STUDY AREA

Vernacular Name	Scientific Name
Amphibians	
Bullfrog	*Rana catesbeiana*
Green Frog	*Rana clamitans melanota*
Gray Treefrog	*Eyla v. versicolor*
Pickerel Frog	*Rana palustris*
Southern Leopard Frog	*Rana p. sphencephala*
Western Chorus Frog	*Pseudacris t. triseriata*
Hellbender	*Cryptobranchus a. alleganiensis*
Central Newt	*Notophthalmus viridescens louisianensis*
Dark-sided Salamander	*Eurycea l. melanopleura*
Eastern Tiger Salamander	*Ambystoma t. tigrinum*
Marbled Salamander	*Ambystoma opacum*
Ringed Salamander	*Ambystoma annulatum*
Spotted Salamander	*Ambystoma maculatum*
Slimy Salamander	*Plethodon g. glutinosus*
American Toad	*Bufo a. americanus*
Dwarf American Toad	*Bufo a. charlesmithi*
Reptiles	
Eastern Collared Lizard	*Crotaphytus collaris collaris*
Northern Fence Lizard	*Sceloporus undulatus hyacinthinus*
Western Slender Glass Lizard	*Ophisaurus attenuatus attenuatus*
Broad-headed Skink	*Eumeces laticeps*
Ground Skink	*Lygosoma laterale*
Common Snapping Turtle	*Chelydra serpentina serpentina*
Map Turtle	*Graptemys geographica*
Ornate Box Turtle	*Terrapene ornata ornata*
Three-toed Box Turtle	*Terrapene carolina triunguis*
Smooth Soft-shelled Turtle	*Trionys mutica mutica*
Western Spiny Soft-shelled Turtle	*Trionyx spinifer hartwegi*
Western Painted Turtle	*Chrysemys picta belli*

Sources: Nancy O'Malley. "Subsistence Strategies at the Sperry Site, Jackson County, Missouri." Masters Thesis, Department of Anthropology, University of Kansas, 1979.

APPENDIX D

MODERN FISH NATIVE TO THE STUDY AREA

MODERN FISH NATIVE TO THE STUDY AREA

Vernacular Name	Scientific Name
Lampreys	*Petromyzonidae*
Gars	*Lepisosteidae*
Eels	*Anguillidae*
Mooneyes	*Hiodontidae*
Minnows	*Cyprinidae*
Suckers	*Catostomidae*
Catfishes	*Ictaluridae*
Silversides	*Antherinidae*
Basses	*Percichthyidae*
Sunfishes	*Centrarchidae*
Perches	*Percidae*
Drums	*Sciaenidae*
Sculpins	*Cottidae*

Sources: Nancy O'Malley. "Subsistence Strategies at the Sperry Site, Jackson County, Missouri." Masters Thesis, Department of Anthropology, University of Kansas, 1979.

APPENDIX E

MIGRATORY AND INDIGENOUS BIRDS OF THE AREA

MIGRATORY AND INDIGENOUS BIRDS OF THE AREA

Vernacular	Scientific	Habitat			
		Prairie	Forest Edge	Oak-Hickory Forest	Aquatic
Crane					
Little Brown Crane	*Grus canadensis*				X
Duck					
American Merganser	*Mergus merganser*				X
Mallard	*Anas platyrhynchos*				X
Gadwall	*Anas strepera*				X
American pintail	*Anas acuta*				X
Green winged Teal	*Anas carolinensis*				X
Blue-winged Teal	*Anas discors*				X
Cinnamon Teal	*Anal cyanoptera*				X
Shoveler	*Spatula clypeata*				X
Redhead Duck	*Aythya americana*				X
Wood Duck	*Aix sponsa*				X
Canvasback	*Aythya valisineria*				X
Ruddy Duck	*Oxyura jamaicensis*				X
American Scoter	*Oidemia nigra*				X
Turkey					
Wild Turkey	*Meleagris gallopavo*			X	
Grouse					
Ruffed Grouse	*Bonasa umbellus*		X	X	
Prairie Chicken	*Tympanuchus cupido*		X	X	
Sharp-tailed Grouse	*Pedioecetes phasianellus*		X	X	

APPENDIX E (CONTINUED)

Vernacular	Scientific	Habitats			
		Prairie	Forest Edge	Oak-Hickory Forest	Aquatic
Hawk					
Goshawk	*Accipiter gentilis*	X			
Cooper's Hawk	*Accipiter cooperi*	X			
Red-tailed Hawk	*Buteo jamaicensis*	X			
Red-shouldered Hawk	*Buteo lineatus*	X			
Pigeon Hawk, Merlin	*Falco columbarius*	X			
Sparrow Hawk	*Falco sparverius*	X			
Golden Eagle	*Aquila chrysaetos*	X			
Bald Eagle	*Haliaetus leuco-cephalus*	X			
Geese					
Canada Goose, Honker	*Branta canadensis*				X
White-fronted	*Anser albifrons*				X
Swan					
Trumpeter Swan	*Olor buccinator*				X
Heron					
Great Blue Heron	*Ardea herodias*				X
Snowy Egret	*Leucophoyx thula*				X
Green Heron	*Butorides virescens*				X

Sources: F. C. Bellrose, "Waterfowl Migration Corridors East of the Rocky Mountains in the United States." Illinois Natural History Survey, Biological Notes, No. 61, Urbana, Illinois, 1968.

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CATCHMENT ANALYSIS OF FOUR KANSAS CITY HOPEWELL ARCHAEOLOGICAL SITES

by

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ABSTRACT

Site catchment analysis is a technique which assumes that different resource potential exists in the environment and that humans respond appropriately to these resource possibilities. Such analysis suggests that site function and location are correlated and that interpretation of site function often can be inferred from knowing site location. This technique was applied to four Kansas City Hopewell (A.D. 1-500) sites, The Hulse site, 23CL109, The Yeo site, 23CL199, The Young site, 23PL4, and 23CI21, for the purpose of assessing the biophysical resources exploited by the inhabitants.

The results of this analysis indicate that the four study sites actually represented two different site types with two distinct functions. One site represents a village (Young) which, more than likely, was occupied year round. Adequate resources existed within the catchment area to satisfy the needs of a permanent population. The other three sites are special function sites occupied seasonally. Two of those sites (Hulse and Yeo) were situated to exploit resources in the oak-hickory and bottomland forest and were used for storage of foodstuffs gathered locally and as hunting camps. The third site (23CI21), in the upland prairie, was primarily a hunting site for migratory waterfowl. These three sites very well may have been utilized on a seasonal round which supports the hypothesis that Kansas City Hopewell

established special function sites to exploit seasonal resources for use in larger, more permanent villages.