Wild Animals and Domesticated Landscapes: A Case Study of Human-animal Relationships in the Middle and Late Woodland Coastal Plain of Virginia

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ABSTRACT PAGE

The author examines human-animal relationships in the Middle and Late Woodland periods using faunal analysis, anthropological theory, and previously analyzed historical documents to gain a better understanding of changes in the way people related to their environment in light of introduction of plant cultivation, population growth, and increasing sedentism. Rather than employing the direct historical approach as many previous scholars have done, the author views the human-deer relationship through the lens of the notion of domesticated landscapes. Ethnographic analogies allow the researcher to form hypotheses about the nature of change in human-animal relationships, and faunal data allow for testing of these hypotheses.

The examination of two previously analyzed faunal assemblages and one analyzed by the author in terms of richness and evenness as well as relative importance of individual species shows that a major change in subsistence practices preceded the gradual transition to a more sedentary lifestyle and the introduction of domesticated plants into the region. It appears that while the traditional form of hunting with a focus on the white-tailed deer endured throughout the periods under study, a more generalized meat procurement technique such as garden hunting became increasingly important starting in the beginning of the Late Woodland period.

While the research results were not conclusive due to numerous possible sources of bias in the data, the work presented here suggests several research questions for future investigation. The author argues that presenting the prehistoric coastal Virginia environment as a domesticated landscape rather than untamed wilderness is a productive research direction that not only sheds some light on the prehistoric human-animal relationships, but also sets the stage for extending the present research topic into the early historic period.

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In Memory of my grandfathers, Evgeniy Ivanovich Zoubtsov and Nikolay Nikolaevich Golenishchev

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INTRODUCTION

One of the most intriguing expressions of cultural diversity is temporal and geographical variation in human-animal relationships. The nature of human-animal relationships in any given culture depends on a combination of interrelated factors, including environmental conditions, social structure, labor organization, subsistence system and many others. Unfortunately while anthropological research is often well-informed about the social aspect of the human-animal relationships, the biological component dealing with animal behavior and environmental response to human actions are given little or no consideration.

The current study uses a multidisciplinary approach combining anthropological theory, faunal analysis, ethnographic analogies, and biological information to examine human-animal relationships in the Late Woodland Coastal Plain of Virginia. I will argue that as numerous changes took place in social relations, human-animal relationships were likely to change as well. I will outline two main directions that the changes were likely to follow, and attempt to test the resulting hypotheses through the use of faunal analysis. The study is greatly informed by anthropological theory of labor division along the gender lines in hunter and gatherer societies as well as by theories of human-animal relationships with an emphasis on domestication.

There are major differences in the way scholars currently perceive the nature of human-deer relationships in the Late Woodland coastal Virginia. While McCabe and McCabe (1984) depict it as "peaceful symbiosis prior to the arrival of Europeans," Turner (1992) states that the deer were overhunted by Virginia Indians as early as the Late Archaic period. In contrast with the above statements that emphasize change but disagree

about its nature and timing, Silver (2001) suggests that because of the low human population density, overexploitation of resources was unlikely, and no form of environmental management was necessary. The common feature of these diverse opinions is that the human-deer relationship appears unchanging prior to the arrival of Europeans.

McCabe and McCabe (1984) as well as Silver (2001) portray pre-colonial Chesapeake environment as an untamed wilderness. While Silver's contribution in incorporating the notion of the environment as a complex living system into the analysis of colonial Chesapeake history is an important one, it seems to undermine the importance of pre-contact environment management practices. The notion of untouched wilderness prior to European colonization supports a false overly-romanticized image of Native Americans living lightly on the land without affecting the environment.

Turner's view, on the other hand, presents the other end of the spectrum as it appears to promote the notion of continuity in the nature of the human-deer relationship starting in the Late Archaic and extending all the way to the early Colonial period when the hunting practices were characterized by overexploitation in an effort to satisfy the demands of the European deerskin market. While the deer population estimates necessary to address the issues raised by Turner remain problematic, it seems unlikely that the human-deer relationship would remain completely unchanging despite numerous cultural events that took place in the Archaic, Early, Middle, and Late Woodland and in the early Colonial periods.

The present study uses anthropological theory, faunal analysis, and ethnographic analogies to challenge the direct historical approach employed by many previous studies

and to show that while the human-deer relationship endured through thousands of years, it is likely that small changes in the nature of that relationship took place as other aspects of social life underwent numerous developments. I will discuss relevant theoretical perspectives of human-animal relationships, propose several models of the change that was likely to take place in the Late Woodland Coastal Plain of Virginia, and use zooarchaeological methods to test these models. While I do not expect conclusive results, I hope that the discussion will shed some light on the complex problem at hand and will inform both prehistoric and historic studies.

One of the most widely studied changes in human-animal relationships is the transition to domestication. This change is often linked with domestication of plants and a major shift in subsistence and settlement patterns. However, not all societies chose domestication as they made the transition to increasing sedentism. This does not mean that people's relationships with animals remained constant. While most human-animal relationship studies explore the process of animal domestication, several authors focus on the complex topic of intensive animal exploitation prior to domestication or in absence of domestication in the most widely accepted sense of the word (Flannery 1968; Tchernov 1993; Ingold 1980). No doubt, changes in hunting methods and perception must have taken place to accommodate meat supply for increasingly large populations. Given the overall continuity of relying on the same resources, such changes may be harder to detect in the archaeological record. However, using multiple sources of information it may be possible to study the continuing yet changing relationship between humans and the animals they hunt.

The concept of domesticated landscapes introduced in the work of Terrell et al. (2003) is extremely useful for addressing the questions outlined above. Terrell et al. redefine domestication to mean a wide range of relationships between various species and the resources they utilize. By harvesting select plants and animals people inevitably affect the natural makeup of their milieu. From the point of view of domesticated landscapes, the environment occupied by people skilled in utilizing its resources can no longer be considered wild. By focusing on the human-animal interactions in the Middle and Late Woodland periods, this study examines an important aspect of the resilient yet flexible relationship between Virginia Coastal Plain Algonquian speakers and their domesticated landscape.

A number of groups in the Eastern United States relied on white-tailed deer as the main source of meat for thousands of years. Many aspects of social life changed, populations grew and became increasingly sedentary, Europeans established their colonies on Native American land, yet the people in the region continued to hunt deer. Some of the groups have been studied extensively, while others are mentioned only as a part of the larger region. I would like to focus on the groups in the Coastal Plain of Virginia and examine their continuous, yet changing relationship with the deer that received less attention in the literature partly due to the scarcity of faunal evidence.

There are several sources of information from which we can learn about human animal relationships in prehistoric Chesapeake. All sources have their biases and are problematic when used in isolation. However, when combined and informed by theory, they can provide some insights into this complex problem. I will use historical accounts specific to the Coastal Plain area as well as comparative material from the wider Eastern

Woodlands region in combination with faunal assemblages from the Coastal Plain sites of Virginia to examine human-deer relationships in the Middle and Late Woodland. I will discuss the strengths and possible biases of archaeological and ethnohistorical sources relative to addressing the research topic outlined above.

Authors who have written about human-animal interactions have often relied on early historical accounts for detailed information about various practices related to subsistence. The records exist because it was important for the colonists to learn if they could survive utilizing native plant and animal resources. Their descriptions of animals often include discussions of taste, easiness of capture, methods involved, and seasonality of availability (Strachey 1998 [1612]; Smith 1986 [1580-1631]). Since the Europeans were learning from Native Americans, we often get a glimpse of their traditional lifeways, even when it was not the focus of the European narrative.

While these accounts are remarkable in the level of detail that they provide, biases abound, and we have to be careful not to project the early historical information on all of prehistory and on the culture that the colonists did not fully understand. The records have several distinct agendas. The most obvious one is the goal of finding resources that are useful to Europeans. Valuable information may have been omitted if it failed to meet this goal. In addition, in the context of colonization, there is often an attempt by colonizers to justify their actions both for their contemporaries and perhaps for the history. It is important to be aware of this tendency that may be a part of the historical accounts. The latter agenda is less clearly defined, and while we cannot be certain of the authors' intent, we have to question their writing in this regard.

While the caution applies to all writings, it is especially relevant for the descriptions of Native American land use practices and overall natural resource management. Unlike the sources described above that concentrate on the practical use of resources, these documents record Native Americans' relationship with animals and plants as perceived by the Europeans. There are several accounts that describe ruthless hunting of deer that resulted in killing all animals regardless of their sex and age (Smith1986 [1580-1631]: 164). Several European laws aiming at hunting regulations were based on this assumption. At the same time, multiple accounts demonstrate that Native Americans had sophisticated methods that could selectively target an individual animal, usually a buck in rut, or a whole herd of deer. It is important to realize that even during deer drives, it is not necessary to kill the whole herd since the hunters can selectively kill certain animals as the her runs by.

Archaeological evidence can help overcome some of the biases inherent in the written documents. Rather than projecting the written evidence from one period onto another as the proponents of the direct historical approach have done, archaeological data allow researchers to critically evaluate the available information using an independent source of evidence. Lapham's (2002) work is exemplary in achieving this goal through a careful combination of bioarchaeological, documentary, and faunal materials. Lapham's research is unique in that it is based on several large, well-preserved faunal assemblages that allow her to trace hunting practices from late prehistoric to early historic period and to identify the types of animals hunted by Native Americans. Lapham (2002) concludes that while prehistoric hunting was characterized by the prevalence of female deer, historical hunting was aimed primarily at males. The author attributes the change to the

demands of the European fur and skin markets and makes important observations about the effects of this change in orientation on the Native American societies.

While Lapham's work focuses on the sites in the western part of Virginia, nothing similar has been attempted for the Coastal Plain region. The main reason is scarcity of faunal materials within archaeological sites due to several reasons, including poor preservation as well as logistics of some of the early excavation projects. While the first reason cannot be helped, it is my hope that more projects include recovery and analysis of both faunal and floral remains as a major part of their research and not just a rare appendix in the back of the report.

While the current study is not able to achieve the level of analysis conducted by Lapham, future studies may prove useful for discovering nuances of change in human-animal relationships in the Late Woodland period, prior to the arrival of Europeans. While the age and sex of animals has not, or in some cases cannot be determined, the relative importance of different species can be assessed. I will compare measures of richness and evenness of several assemblages in order to learn if there is any indication of change in relative contributions of deer to the diet as compared to small mammals. While white-tailed deer remained the main source of protein throughout late prehistory, subtle differences in deer exploitation pattern may be present and should be reflective of changes in social life that are not directly linked to subsistence.

Zooarcaheological information by itself is limited in the types of insights it can provide. Bowen (1996) stresses the importance of interdisciplinary approach to gain the fullest extent of information possible. She points out that the information that can be obtained from bones alone is limited in terms of understanding of "cultural meanings, the

subsistence system's social and economic relationships, or the household's status or cultural affiliation" (Bowen 1996: 90). However, bones can be most useful in answering archaeological questions when used in combination with other sources that can both make the information more complete and eliminate many of the biases that the faunal data possess (Ibid.). In historical archaeology, additional sources usually include written documents. While historical accounts can be used to gain some insight into prehistoric practices, theory has to be a central component of such studies.

While recognizing the limitations and biases of sources that I will use to address the research question discussed above, it is my hope that by combining multiple sources and informing the discussion by several theories, it will be possible to understand some of the nuances of human-animal relationships in the Late Woodland Coastal Plain of Virginia. Despite the limitations and scarcity of the available materials, the research should have wider implications for the Chesapeake prehistory as it looks beyond subsistence practices and aims to understand the complexities of the relationship between people and their domesticated landscape that persisted for thousands of years and survived major changes that proved catastrophic for other aspects of social life.

CHAPTER I:

ARCHAEOLOGICAL AND ETHNOGRAPHIC BACKGROUND

According to Rountree, most of the information about the Native peoples of Virginia comes from archaeology, works of Captain John Smith, and early English colonists (Rountree 1992: 1-6). The archaeological record in combination with the historical documents provides a necessary context for the main problem considered in the current study. In order to gain an insight into the change in human-animal relationships in the Late Woodland one has to understand the natural setting of the region, the availability of wild resources as well as the nature of the social changes that took place in the Late Woodland as it is currently understood by archaeologists.

Rountree describes the general natural setting of the Virginia Coastal Plain. In geological terms it is classified as the flooded coastline, and the waterways of the area are tidal estuaries (Rountree 1992: 18). Rountree adds that at the time of the English arrival to Virginia, the climate was several degrees cooler than today (Ibid). The author lists "sand fiddlers (small land crabs); oysters, which grew along the shores as well as on shallow bars in the streams; and two kinds of clams," as well as blue shell crabs, fish, and migratory ducks as the most important resources that the Virginia Natives obtained from salt water marshes (Ibid., 24-5).

Rountree lists a great variety of wildlife that was present in Virginia in the 1600s. She mentions "black bears, raccoons, opossums, long-tailed weasels, mink, fishers, river otters, striped skunks, red and gray foxes, and civet cats" as well as "wolves, which the English and their Indian employees later exterminated" (Rountree 1992: 27). Among the

smaller animals that provided food for the carnivores were "woodchucks, squirrels (four species, including flying squirrels), mice (six species), rats (two species), voles (two species), moles, shrews, rabbits (two species), muskrats, and beavers" (Ibid.). Some of the smaller animals may also have been hunted by people, and the nature of each faunal assemblage in the collection should be carefully examined for evidence of non-human predation.

Rountree also lists a great variety of birds that were not consumed although it is not quite clear how the author came to this conclusion (1992: 28). The variety of fish described by Rountree is tremendous. To list just a few, there were small mouth bass, largemouth bass, the yellow perch, channel catfish, white catfish, brown bullhead, chain pickerel, redfin pickerel, and eels, and one of the biggest fish in region was sturgeon (Rountree1992: 29).

While the information about the availability of wild animals provides an important starting point, the choices people make in utilizing some animals and not others as well as different relationships they establish with various species inform us of their particular culture (C.f. Sahlins 1976: 174-5). Several works of early colonists collected under the title *Jamestown Narratives* are rather informative both about the diversity of wild life and more specifically about the animals used by colonists and the Algonquian speakers.

Ralph Hamor is rather enthusiastic about "tasteful but also wholesome and nourishing food" obtained from the wild animals of Virginia such as "bears, deer of all sorts, ... beavers, otters, foxes, racounes (almost as big as a fox; as good meat as a lamb), hares, wildcats, muskrats, squirrels, flying and other of three of four sorts, apossumes (... a beast of as strange as incredible nature)" (Hamor 1998 [1615]: 817). However, while

Hamor has consumed the meat of these animals and found it to his liking, it is not clear whether the Native people of the region explored the same wild life resources.

George Percy mentions the same variety of wild animals in Virginia, although he is not as precise as Hamor in his identification, and adds "wild beasts unknown" to his list (Percy 1998 [1625]: 96). Percy briefly mentions a use of animal products for clothing: "their privities are covered with beasts' skins beset commonly with little bones or beasts' teeth" (Ibid, 92). Percy also describes the use of feathers in headdresses (Ibid.).

William Strachey is more specific about which animals were actually hunted and consumed both by the Europeans and the Powhatans. Among the main animals used for food are "deer, both red and fallow," "a beast they call aroughcoune" that the settlers hunted and obtained by trade, squirrels, both ground and flying, muskrats, bears "which the Indians hunt most greedily, for indeed they love them above all other their flesh," beavers, "which to eat savages esteem a great delicate" (Strachey 1998 [1612]: 680-682). According to Strachey, martens, polecats, and weasels' skins were utilized in clothing (Ibid, 682). Among birds Strachey favors turkey as "the best of any kind of flesh which [he has]... ever eaten there" (Ibid, 683). Strachey is amazed by a great variety of fish and shellfish that is consumed both by the colonists and the Powhatans (Ibid, 684). The only domesticated animals mentioned by Strachey are dogs (Ibid, 682).

According to Rountree's extensive research and early colonists' accounts, the land animals that were utilized by the Chickahominy and other Algonquian-speaking groups range in size from squirrel to bear. In addition, turkey and possibly a variety of smaller birds have contributed to the diet. Fish of various sizes and several varieties of shellfish

were consumed. Non-dietary use of animals included the use of deerskins and the fur of smaller animals for clothing and trade.

While the historical documents provide useful information about the possible contents of the diet and methods of food preparation, they are less informative about the dynamics of human-animal relationships in the Late Woodland Chesapeake. Dating to a period with a drastically different political and economic situation, the documents contain a highly biased account of the Native Virginians' land management practices. This view is especially apparent in the early Virginia laws regarding deer hunting regulations.

Several laws passed to regulate the seasonality of deer hunting demonstrate both the depletion of deer population and the attitude of the European lawmakers towards the Indians' hunting practices. In 1699 the first act to establish the appropriate seasons for killing of the deer was passed. According to the preamble for this act, the deer populating was greatly diminished by the unseasonable killing of the deer. The wording in the preamble (Henning 1969[1823], vol. 3: 180) speaks for itself:

> Whereas the Deer of this his majestyes colony and dominion is very much destroyed and diminished by the unseasonable killing them when poor and of Does bigg with young to the great detriment of the inhabitants of this his majestyes colony and dominion any considerable benefit to those that kill them...

With the enactment of the new law, deer hunting was prohibited "between first day of February and last day of July "(Hening 1969[1823], vol. 3: 180). A later act of 1705 extended the period during which the deer were not to be killed to last from "the first day of January in each year, and last day of August succeeding" (Ibid., 462). The same point is made even more harshly in an often-cited assessment by John Smith: "at all times of the yeare they [Indians] never spare male nor female, old nor young, egges nor birds, fat

nor leane, in season or out of season with them, all is one" (Smith 1987: 174). Both the preamble and Smith's statement demonstrate the importance of deer for Virginia economy in the early colonial period as well as a strong bias and a difficulty to gain the information about the true nature of the Natives' relationship with the deer from such sources.

The preamble to the 1699 law implies that the deer population suffered a considerable depletion at the time that it was written. The question of the population dynamics of the white-tailed deer both prior and following the arrival of Europeans is an important one. The answer to this question can be obtained through a detailed study of deer remains from archaeological sites. While the question is beyond the scope of the present study it is a fruitful direction for a future investigation. The dynamics of population growth and depletion can be caused both by environmental factors and human strategies. A future study addressing this question would bring an important contribution to understanding the human-deer relationships and help resolve the controversy about the timing of the greatest periods of population decline.

The brief evaluation of early Virginia laws shows that one cannot gain a clear picture of the earlier human-animal relationships both because of the temporal distance between the documents and the period of interest and because of a possibility of a rather strong bias saturating these records. The archaeology of the region is currently developing rapidly as new findings from Werowocomoco and other sites in the region help address the complex question of social changes both prehistorically and in the Contact period. Archaeological studies discussed below provide a necessary background for

understanding the social processes that accompanied the development of human-deer relationships in the Middle and Late Woodland Coastal Plain.

The Late Woodland period in the Virginia Coastal Plain is generally seen as a period of rapid change, characterized by population growth, increasing sedentarism, and "increasingly complex means of socio-cultural integration within the region" (Turner 1992: 97). The complex nature of these changes has recently come into light through Gallivan's work who has examined the social changes in greater detail in all three Virginian physiographical provinces. According to Gallivan (2003) the key elements for a series of social changes were adaptation of corn agriculture and the associated increasing sedentarism of the villages. The changes started slowly in the Late Woodland I phase (900-1200 AD) and became more rapid and abrupt in the Late Woodland II phase (1200-1500 AD) resulting in "institutionalization of social inequality" and "reorganization of production around domestic groups" (Gallivan 2003: 158).

Flannery (1968) and Ingold (1980) show that changes in social structure go hand in hand with the change in human-animal relationships. Late Woodland changes described by Gallivan were likely accompanied by changes in the way the Coastal Plain natives were utilizing deer in relation to other resources. The challenge is determining what directions the changes may have followed and using limited archaeological evidence to test the resulting hypothesis.

CHAPTER II:

THEORETICAL BACKGROUND

There are several theoretical directions that guide the study presented here. The theory of change in human-animal relationships forms the core of the study. However, in order to properly understand the change, it has to be viewed in a wider social context and considered along with transitions in other aspects of social life that accompany it. Kent Flannery's ideas about seasonality and scheduling as well as numerous authors' discussions of gender relations in the context of social change, will help shed some light on the decision-making process that was involved in the Late Woodland transition. Discussions of the way in which these topics fit into the relationship between history and prehistory in anthropological studies will show that the current study is relevant both for historical and prehistoric archaeology of the region.

While the white-tailed deer were never domesticated for various reasons discussed below, different views of domestication can provide a useful theoretical base for understanding human-animal relationships in general. Scholars of domestication have dedicated a great deal of time and effort to studying different ways in which people can relate to animals both in their wild and domesticated state. When applied to the study of deer in the Virginia Coastal Plain these studies can help illuminate important aspects of human-animal relationships that may be invisible or hard to detect archaeologically.

Thinking of human-animal relationships in terms of binary oppositions such as hunting of the wild animals versus husbandry of the domesticated ones is both inaccurate and misleading. However, to move away from this view it is not enough to concede the existence of the proverbial grey areas. Rather, one has to understand the context-specific

nuances of the complex process of change in human-animal relationships, the change that Ingold terms "from trust to domination" (Ingold 1994).

It is important to understand several aspects of the domestication process that have been examined by a number of scholars. Domestication does not follow a predetermined direction. Neither is it necessary, and the history of deer hunting by Native Americans in the Eastern United States is a great example of complex societies utilizing a non-domesticate as their primary source of meat. I will discuss general directions in the studies of animal domestication as a type of human-animal relationships and summarize some of the theoretical approaches to gender, seasonality, and labor organization that are relevant for the present research.

Many scholars have struggled in an attempt to define domestication and study the main mechanism that may be behind this complex process. The definitions of domestication proposed by different scholars vary in the aspects of the process that they emphasize. While some (Rindos 1984; Smith 2001; Clutton-Brock 1984) depict it as a transition towards a complete control over the animals, others (Budiansky 1999; Terrell et al. 2003) allow animals an active role in the process and more flexibility in terms of cross-breeding with the wild progenitors and see it as both a natural and a cultural occurrence. Some analysts (Hecker 1982) go as far as to reject the concept altogether by replacing it with a new term that is broader and applicable to more situations that would normally fall under the topic of domestication.

Clutton-Brock states that the mechanism of domestication is taming of young animals by hunters (Clutton-Brock 1994). However, as Budiansky (1999) justly points out, taming applies to individual animals rather than whole populations and is therefore an

insufficient explanation. The explanation also does not allow animals any influence over what species are accepted into the hierarchy of the human society. The hunter is the sole selecting agent in killing the parent and caring for its young.

An alternative mechanism allows animals a more active role in changing their relationship with humans. According to this view, the animals that were less afraid to approach human settlements and found that the benefits of the association with our species outweighed the risks, became domesticated (Budiansky 1999). Whatever the mechanism behind the process, it is important to remember that based on the variability of domestication examples around the world, it is likely that the process took place many times and in different ways depending on the specifics of local physical and cultural environment as well as the behavior dynamics of the animals involved.

Scholars also disagree over their definitions of a domesticated animal. Clutton-Brock (1994) emphasizes the importance of complete control over breeding of the animals and separation of the domesticated animals from their wild progenitors. Budiansky (1999), on the other hand, points out that cross-breeding is a frequent occurrence among domesticated animals and their wild relatives, that occurs both with and without the owner's intention. Several other authors link the process of domestication to an overall change in social dynamics, stressing the importance of understanding numerous aspects of society in question in order to study the specific forms of domestication that might take place (Flannery 1989; Ingold 1994).

In an attempt to redefine domestication, Hecker (1982) goes as far as to propose a new term of cultural control that would replace the old concept. He defines cultural control as "that array of human behaviors that has a profound effect on some aspect of the

exploited animal population's natural behavior and dramatically interferes with its movements, breeding schedule, or population structure in such a way as to make the animals more "accessible" to humans" (Hecker 1982: 219). The author argues for a continuum of possible human-animal relationships rather than a simple distinction between wild and domesticated animals. He argues that in some instances natural environment may serve as the means for confining animals to a limited space, and cultural interventions such as construction of fences is not necessary. He also states that selective hunting constitutes a form of cultural control and should be distinguished from other forms of hunting.

While Hecker's idea of a broader spectrum of possible human-animal relationships is very appealing, the analytical applications for his new term are problematic. It is hard to imagine a hunter that is not aware of the of prey animals' social structure, and some form of discretion is likely to be present in all forms of hunting. If selective hunting, as Hecker proposes, is an indication of cultural control, his term should apply in all instances of human-animal interactions, making it less valuable as an analytical tool. The lesson to be learned from Hecker's work is the recognition of multiple forms of human-animal relationships, domestication being just one of them.

Domestication of animals often goes hand in hand with domestication of plants. Clutton-Brock points out that plant domestication is usually followed by domestication of animals (Clutton-Brock 1994). It is also usually associated with complex level sedentary societies that have to find a new way of animal utilization that does not interfere with the seasonal cycle of plant cultivation. Native Americans' continuing reliance on white-tailed deer in the Eastern United States is an interesting example that does not follow the

usual sequence of events. However, the problem worth investigating is not why the deer were never domesticated, but rather what forms of management and what aspects of deer biology allowed the animals to survive through hundreds of years of intensive exploitation. Another interesting question to consider is what changes took place in the course of Native Americans' interactions with deer in relation to overall changes in subsistence, settlement patterns, and social organization. Focusing on the Late Woodland period presents an opportunity to examine possible changes in human-deer relationships in the context of numerous transitions in several aspects of social life.

I will draw on the strengths of several theoretical perspectives on human-animal relationships discussed above. Clutton-Brock's emphasis on the importance of the animals' natural behavior in determining the nature of their interaction with humans can be complimented by Budiansky's insight that the animals have to play an active role in their interactions with humans. The idea that domestication does not have to take place, in combination with Hecker's discussion of a continuum of possible forms of human-animal relationships is a good starting point from which Native American deer hunting can be analyzed. In addition to various scholars' treatment of animal domestication, Kent Flannery's study of resource utilization in Early Mesoamerica is especially relevant. Flannery presents the concept of scheduling to explain ways in which societies resolve the problem of simultaneous availability of multiple resource and its application to the transition to maize agriculture (Flannery 1968).

I have outlined some of the existing ideas about domestication in general, both in terms of the dynamics of the process and various definitions of the concept. There is a considerable amount of variation in the processes of domestication in different parts of

the world. The variation arises both from different cultural practices and perceptions as well as variability in the behavior of animals involved and the ways in which they interact with humans and one another. While in a number of societies the increasing social complexity is linked to domestication of plants and animals, Eastern Woodlands present an interesting example where a number of complex societies continued to rely on deer as the main source of meat without domesticating the animal. The current study will examine aspects of deer behavior more in depth and in relation to other species in the region in order to understand the complex dynamics of human-animal relationships and propose a number of changes that may have taken place in the Late Woodland period.

Kent Flannery's (1968) work discussed above mentions labor division based on gender as one of the most basic mechanisms in society that are used to resolve the conflict between numerous resource availability. While Flannery focuses on scheduling and seasonality, other scholars have dedicated more time to understanding the role of gender relations in the decision-making processes that guide changes in different aspects of social life. The discussion of gender roles in the context of transition to corn agriculture in the Eastern Woodlands seems especially relevant.

Several authors have built their ideas about gender relations in the past on direct dietary evidence, while others have used a less direct approach to the question, using ethnographic analogies as the main source of evidence. Both approaches present a valuable contribution and can inform the current study. Buikstra et al.'s (1987) bioarchaeological research reveals some interesting information about gender-related dietary differences. The authors' analysis demonstrates that there was a differential access dietary resources within the prehistoric population. The authors state that meat

consumption among men in prehistoric West-Central Illinois was significantly higher than that of women. A similar direct approach to diet variability along the gender lines is provided by Gremillion and Sobolik in their study of paleofeces in the Mammoth Caves (Gremillion and Sobolik 1996).

In contrast with Buikstra et al. (1987), Watson and Kennedy (1991) employ a less direct approach to the study of gender differences in prehistory. The authors criticize several older studies for promoting the idea of women as passive gatherers concerned largely with the raring of plants and men as active hunters who are free to move away from home and hunt the animals of their choice. Watson and Kennedy's critique focuses on the passive role allotted to women in the older studies. They urge scholars to acknowledge women's accomplishments in "the one realm that is traditionally granted them" (Watson and Kennedy 1991: 264). The authors argue that in the widely accepted coevolution model "the plants virtually domesticate themselves" (Ibid, 262). Watson and Kennedy call for an increasing emphasis on intention and innovation accomplished by women as primary agents in the process of plant domestication with all of its far reaching consequences.

While it is hard to disagree with some of the authors' critiques of earlier studies, their solution is a problematic one. The issue of the connection between human intentions and consequences of their actions is rather complicated. In relation to the adoption of agriculture, some authors point out that while the short-term consequences are more closely linked with human intentions, the long-term ones are rarely foreseen. Nassaney (1987) points to a disjunction between human intentions and the long-term consequences of their actions. To illustrate his point the author discusses the importance of subsistence

intensification for the emergence of social complexity. As various resources such as physical materials or knowledge, can be subject to unequal access by different groups within the society, there is a potential for an increasing stratification (Nassaney 1987 :133). Nassaney views the increased social complexity as one of the unintended and unforeseen consequences of adoption of horticulture. No matter what group within the society is chiefly responsible for this important transition, it is doubtful that the complex results of the adoption of corn horticulture could be foreseen by the people who participated in the transformation. Therefore, while the active role of groups of individuals should be acknowledged, they should not be credited with all cultural processes that followed the transition.

In addition, the mode of presentation of Watson and Kennedy's argument seems to create a bias opposite to the one they are setting out to fight. One statement is particularly illustrative, as the authors claim, "although everyone joins in consumption and defecation – it is women who are responsible for processing, and for food preparation and storage" (Watson and Kennedy 1991: 262). While promoting the role of women, the cited statement diminishes the role of men to a laughable minimum and throws a study in the realm of the same gender-related bias it is trying so hard to oppose. The goal of the current study is to consider gender-based divisions of labor as a part of a complex system of interrelated and interdependent factors that form social life. While labor division is not the focus of the study presented here, it is a vital component of the change in subsistence that took place in the Late Woodland.

Gender relationships present one example of complex anthropological issues that can be extremely challenging to examine in prehistoric studies and more often fall in the

realm of historic archaeology. However, the line separating prehistory and history in archaeology has often appeared too rigid, and both subdisciplines would benefit greatly if the line were softened allowing ideas to flow in both directions.

Joanne Bowen's (1988) research demonstrates how historical studies can benefit from questions that are usually a part of prehistoric enquiries and are not commonly addressed in historical studies. She shows that seasonality plays a major role in the formation of subsistence patterns in the historical context, even though it is not usually taken into account because of its strong association with prehistory. Just as historic archaeology research can benefit from the input of ideas taken from prehistory, so prehistory can gain a great deal from a better connection with history.

Kent Lightfoot explores the benefits of such a connection in great detail. He states that in order to understand historical events, one has to have a detailed knowledge of their roots in prehistory. Lightfoot calls for a multidisciplinary approach to the study of the past in which documentary research has to be combined with archaeological evidence as they can compliment and inform each other's findings (Lightfoot 1995: 203). While Lightfoot's emphasis is on the contribution of prehistory to historical questions, I would like to explore the movement of ideas in the opposite direction and employ theoretical approaches that are frequently used in historical studies to help develop a more complicated picture of prehistoric events that are all too often seen in evolutionary or system-oriented terms that preclude the exploration of more complex social processes that took place in the remote past.

While historical data can contribute greatly to our understanding of prehistory, it has to be used carefully and with understanding of its biases. Unfortunately, the desire to

enrich the presentation of the past can sometimes result in direct projection of the historical information into prehistory. Such projections are especially dangerous given the vivid descriptions that are often found in historic accounts that can create a deceptively clear view of the past events that nay not necessarily be correct.

The current understanding of human-deer relationships in Coastal Plain of Virginia suffers greatly from the divide between prehistoric and historic studies. Barber and Barfield go as far as to suggest, "Virginia prehistory has been a victim of history" (Barfield and Barber 2000: 225). The contradictions between different authors' view discussed in the introductory chapter show how difficult it is to form a clear picture of the complex human-animal relationships in the absence of the written record. There is a tendency to either project the relationships described in historical documents farther back in time than the evidence allows or to assume that there is a sharp break between the prehistoric relationships that we know less about and historic ones that are described in the documents with all their problematic biases. The present study will attempt to examine the problem on its own terms, without heavy reliance on documents or problematic estimates of past human populations for answers. Documentary, ethnographic, and theoretical information will be used to formulate the hypotheses, while faunal materials will be used to test them. The study will provide a foundation not only for a better understanding of prehistoric human-animal relationships, but also for examining their development after the arrival of the European colonists. The discussion of an arguably larger change that took place in the 17th century cannot take place unless we start by examining the nature of the relationship as it existed before.

While there appears to be a strong continuity in the importance of white-tailed deer as the main source of sustenance for Native Americans in the Eastern Woodlands both during historic and prehistoric times, it is likely that several changes in the way humans related to deer took place in the course of hundreds of years of interaction. Arguably, the most dramatic change has to do with the arrival of European settlers and the beginning of the deerskin trade. Some authors see this shift as a drastic transition from "peaceful symbiosis" to ruthless exploitation (McCabe and McCabe 1984). In order to better understand the nature of the transition, we have to examine the human-deer relationship prior to the beginning of the skin trade in more detail. Deer hunting practices were intimately linked with the dynamics of social interactions between different members of the society, and any changes in the human-animal relationships have to be viewed both in the context of deer biology and ongoing social processes.

CHAPTER III:

APPLICATION OF THEORY, BIOLOGY AND ETHNOGRAPHIC ANALOGIES: BUILDING A MODEL OF LATE WOODLAND CHANGES IN HUMAN-ANIMAL RELATIONSHIPS

In order to make the theories discussed above applicable the Virginia Coastal Plain societies in the Late Woodland, we have to examine a number of factors that are likely to affect human-animal relationships in this period. I will examine deer behavior as it relates to domestication, discuss what is known about labor division among the coastal Algonquians, and contextualize the human-animal relationships in terms of seasonality and scheduling specific to the region and the selected time period.

White-tailed deer exhibit a number of characteristics that according to Clutton-Brock make them an unlikely candidate for domestication. According to Clutton-Brock, "the ideal progenitor of a domestic herbivore comes from a species that is not territorial, lives in large, wide-ranging herds of mixed sexes, organized in hierarchies, has a wide tolerance of different food plants, a short flight distance, and a relatively slow response to danger (Clutton-Brock 1994: 28).

The deer are extremely adaptable in their diet, are able to survive in a wide range of environments and have developed some amazing strategies for dealing with predators (Hesselton and Monson Hesselton 1982; Geist 1998: 281). The incredible adaptability of deer has allowed them to survive and flourish through periods of intensive exploitation by humans both in prehistoric and historic times. At the same time, the fact that "the white-tail is shy, secretive, and usually elusive animal" makes deer domestication unlikely (Hesselton and Monson Hesselton 1982). Another factor is the white-tails'

response to predators. According to Hesselton and Monson Hesselton, "deer will usually panic and run from a predator, occasionally one will turn and fight using the front legs" (Ibid, 886).

The herd structure of the white-tailed deer can also be considered an unfavorable characteristic for domestication. The composition of the herd changes seasonally both due to the life cycle events and availability of food. In general, the deer form family groups consisting of a doe with her offspring and bachelor herds. The family groups split up when does are about to give birth, while bachelor herds separate during the rut (Marchinton and Hirth 1984: 142-4). While several aspects of the deer herd structure might have played a role in establishing a nature of their relationship with humans, one of the most important characteristics that many domesticated animal (including the white-tails' close relatives caribous and elk) possess and that the deer lack is the ability to congregate and maintain cohesiveness of larger groups. It is interesting to consider the form the human-deer relationships would have taken, were the white-tails more gregarious.

Another important aspect of behavior that makes some animals better suited for domestication is the extent of their movement both seasonally and on daily basis. The movement can be assessed using the concept of home range that is defined as "the area traversed on an annual basis by an individual in its normal activities of food gathering, mating and caring for young" (Ibid, 129). The home range of the white-tail deer varies depending on the geographical region as well as the animals' age and sex. Despite a great deal of variation, it is generally smaller than that of other North American cervid species (Ibid.).

Last but not least, it is important to consider the effect of human subsistence activities on the deer population. McCullough points out that deer populations are susceptible to irruptions which "occur under circumstances in which a population of ungulates is at low in density in favorable habitat conditions and lives in the absence of effective controlling factors" (McCullough 1997: 70). Today production of agricultural crops is a major contributor to irruptive behavior by white-tailed deer (Ibid.). At the same time, several scholars list corn among some of the favorite foods of white-tailed deer (Hesselton and Monson Hesselton 1982; Neumann 1989). Given the white-tails' taste for corn and the effects of a new source of food on the ungulate populations, it is possible that the introduction of maize agriculture caused a rapid growth of white-tail deer population in Virginia. As more deer became available in the areas adjacent to the settlement, it is possible that humans' reliance on the white-tails for food increased.

However, the point to recall from the discussion of theoretical approaches above, is that "domestication seems natural only because it happened" (Budiansky 1999: 107). At the same time, Flannery's work on domestication of guanaco is an example of domestication of an animal that at first glance does not seem to meet Clutton-Brock's criteria of "an ideal progenitor of a domestic herbivore" (Flannery 1989; Clutton-Brock 1994). While there may be a key biological difference between the guanaco and the white-tailed deer, it seems more likely that a combination of factors, including social practices and humans' perceptions of animals are involved. While the deer were never domesticated in the narrowest sense of the word, the landscape that they inhabited certainly was. Through different land management practices, Virginia Indians created anthropogenic landscapes that they could exploit for various resources. The main tool in

landscape management of the coastal Algonquians was controlled burning. The burning is recorded in many historical accounts, and archaeological evidence suggests that it extends far into the prehistoric period (Cronon 1983). Several authors have discussed the beneficial effects of fire on the quality of soil and animal resource availability (Cronon 1983; Neusius 1996; Miller 2001). As the underbrush burns, vital nutrients are released into the soil increasing its fertility. As the vegetation reclaims the burned spots, the food availability for animals increases greatly, resulting in appearance of "resource patches" that can be harvested by people (Neussius 1996: 279).

When we consider such landscape management practices in the context of Terrell et al.'s (2003) view of domestication, it becomes clear that the deer along with other animals and plants whose availability increased as a result of controlled burning, were far from wild. Cronon's discussion of New England land management practices supports this view. According to Cronon, early European observers failed to recognize the true nature of the Indian relations to the land because it was far removed from the form of domestication they were accustomed to. They "lacked the conceptual tools to realize that Indians were practicing a more distant kind of husbandry of their own" (Cronon 1983: 52).

The view presented above has several implications for addressing the main problem of the current study. With intensification of plant cultivation related to introduction of corn, more fields would be cleared through the controlled use of fire resulting in a larger affect of human activities on the deer population. In addition to irruption tendency with the introduction of new food sources, there are grounds to suggest that the deer

population increased in the Late Woodland due to the intensification of the unique husbandry system practiced by Virginia Indians.

In addition to the factors discussed above, consideration of gender division and scheduling can help us examine the nature of change in human-deer relationship in more detail and in form of archaeologically testable hypotheses. Based on what is known about the seasonal cycle of subsistence activities, it appears that the introduction of maize resulted in several conflicts in scheduling that could be resolved in a number of ways. The general patterns of village subsistence activities, deer hunting practices and deer natural cycle are presented in a chart below (Fig. 1). The chart is based on a variety of sources and should be viewed as a flexible representation of the seasonal subsistence cycle.

According to Gallivan (2003), introduction of corn triggered population growth in the Late Woodland. With more mouths to feed, it seems reasonable to suggest that the Coastal Virginia groups found a way to intensify the exploitation of their resources. While maize may have been a triggering factor that created increase in population in the first place, it was also part of the solution as it served to smooth over periods of resource scarcity. At the same time it created a conflict in scheduling since its planting time coincided with the fishing season while its harvest coincided with the time of the year when the deer were in their prime condition.

There are several possible ways to resolve the created conflict. The mechanism that was already in place and that is suggested by Flannery as the most basic resolution of scheduling conflicts, is labor division by gender. While most cultivation activities were performed by women, hunting was the realm of men (Cronon 1983; Rountree 1989,

1998). However, the situation is complicated further by a suggestion that that men were contributing to some agricultural activities including not only the preparation of the fields which is consistent with their traditional role in labor division, but also in the harvesting activities (Gallivan 2003).

On the other hand, harvesting time is also associated with feasting when the whole community comes together in celebration before dispersing for winter months. Feasts would require large quantities of maize and deer meat to feed the community. It is plausible therefore that a group of men may have been designated to go on hunting trips while the remaining members of the community engaged in harvesting. This suggestion is consistent with Rountree's (1998) hypothesis that when the work load intensified, Virginia Indians formed kinship-based work groups. Each group was responsible for a specific task. While it is a plausible solution, the hypothesis is difficult to test since no documentary evidence in available supporting this view. In postulating her view of labor organization system, Rountree relies mostly on ethnographic analogies and ethnobotanical knowledge of local resources.

In addition to gender-based labor division, Flannery suggests that as maize becomes more important, the importance of protein in the diet decreases. The adjustment in scheduling in his study favors maize over deer. This hypothesis may be tested through an analysis of both faunal and ethnobotanical data and examination of relative contribution to diet of each component. Bioarchaeological data can provide even more direct evidence of diet composition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Villages are dispersed, hunting and gathering	Villages are dispersed, hunting and gathering	Fishing, Turkey, Squirrel	Fishing, Turkey, Squirrel; Planting	Planting of the fields, live off of acorns, walnuts* and fish	Tockohow, berries Planting of the fields, live off of acorns, walnuts* and fish Unripened corn eaten	Tockohow, Berries, fish Unripened corn eaten	Tockohow, Berries, fish Unripened corn eaten	Corn harvested, Acorns gathered for winter; Feasting	Corn harvested. Acorns gathered for winter; Feasting	Harvest and feasting until mid Nov.	People disperse for hunting and gathering
Deer drives	Deer drives	Deer Drives			Occasional killing of young fawns	Occasional killing of young fawns	Occasional killing of young fawns		Deer drives	Deer drives	Deer drives
End of rutting season Early Jan – Antlers fall off		Deer in poorest condition; annual antler growth begins	Winter coat is shed; Annual antler growth begins	Winter coat is shed; Fawns are born	Winter coat is shed; Fawns are born		Molt, spotted coat lost; Antler growth continues	Molt, spotted coat lost; Antler growth is complete; Rutting begins; Sparring – Hierarchy establishe d/confirm ed	Deer in prime condition; Rutting; Breeding; Bachelor herds break up	Deer in prime condition; Rutting; Breeding; Bachelor herds break up	Rutting; Late Dec. Antlers fall off

Figure 1. Seasonality of Utilization of Plant and Animal Resources and Phases of Deer Life Cycle.

*Please note: acorns and walnuts are not available in May and June (Barber and Barfield 1992: 228). However, they could be stored.

However, given the importance of deer hunting for the establishment and maintenance of men's status in the society, it is not likely that such change took place in Virginia Coastal Plains. Perhaps a more applicable consideration is a model based on Tchernov's (1993) study of gazelle hunting in the Southern Levant. Deer are not the only animals whose close association with humans did not result in domestication in its narrowest sense. The pattern of gazelle hunting in the Southern Levant can perhaps provide a model for discussing the humans' relations with the deer in prehistoric Virginia. Like deer, gazelles were not domesticated because of their natural behavior. Instead, they were subject to selective hunting practices (Tchernov 1993: 205-6). With increasing demands for protein by a growing population the hunting strategies changed from solitary to communal drives and surrounds. However, instead of killing the whole herd, the inhabitants of the Natufian sites exercised male culling, which strongly affected the morphology of the gazelles and resulted in changes similar to the ones observed among domesticated animals (Ibid, 206). By analogy, it is possible that the frequency of deer drives increased in the Late Woodland Virginia in comparison with the earlier periods. However, Lapham's research shows that more females were killed in contrast with the selection for expandable males in the Southern Levant (Lapham 2002).

Dowling examines various ways in which a change in hunting practices can affect social relationships. An increasing importance of deer drives as opposed to stalking by lone individuals or by a small group of men would have strong implications for the manner in which ownership of the kill is established. A change in patterns of resource distribution would be a social reflection of change in the nature of human-deer interactions.

The model presented above that the population growth resulted in increasing frequency of deer drives may be tested archaeologically by examining the change in the importance of deer relative to other species. However, the results of such analysis may be indicative of several factors. Increasing amounts of deer in the diet may be the result of increasing deer availability due to intensification of land management practices discussed above. While a one-to-one correlation between the fluctuation in deer availability and deer consumption may not be possible, the analysis may reveal important aspects of change in human-animal relationship that can be explained in a number of ways suggested above.

An alternative resolution of the scheduling conflict may be the increasing reliance on garden hunting that is characteristic of many horticultural societies both in the tropical and temporal regions (Neussius 1996). Garden hunting refers to the harvesting through various means of species that are attracted to cultivated plants. Garden hunting is closely related to the concept of domesticated landscapes as "horticulturalists establish anthropogenic ecosystems in which people live" (Ibid, 275). The concept of allowing animals to enter the garden and become a part of the anthropogenic concept once again reinforces the idea of a special form of domestication of deer and other species attracted to gardens, without total control over breeding and movement of the animals.

Neussius's study addresses a problem that is comparable in many ways to the Coastal Virginia case. Not unlike the coastal Algonquians, the Dolores Anasazi had a mixed subsistence base, relying on corn, beans and squash as well as a variety of wild plant and animal species. Neussius presents garden hunting as a resolution for conflict in scheduling when gardening requires increasing amounts of labor and interferes with

hunting activities. Rountree's (1998: 10) discussion of boys' role in guarding the garden while contributing to the protein source acquisition supports the relevance of garden hunting for Virginia Coastal Plains subsistence.

Neussius suggests several ways of testing the presence and importance of garden hunting archaeologically. One can examine relative proportion of species that are target for garden hunting, compare taxonomic composition of the assemblage to the natural species distribution in the area, and analyze diversity of faunal assemblages with the expectation of high diversity being indicative of garden hunting (Neussius 1996: 277). While none of the methods are conclusive on their own, together they can be helpful for identification of garden hunting in the archaeological record.

Several hypotheses of the possible directions of change in human-deer relationships have been outlined above. The hypotheses are based on the application of broad theoretical considerations of human-animal relationships, placed in the framework of gender-based labor division and considerations of scheduling and seasonality, to the more specific context of Late Woodland Coastal Plains Virginia. The next step of the present study will be testing of the presented hypothesis archaeologically. I have identified several faunal assemblages from various temporal contexts that can be broadly grouped into period before maize introduction (Middle Woodland and Late Woodland I), and period following maize introduction (Late Woodland II). By examining relative contribution of deer to the diet in each assemblage as well as examining any fluctuations in richness and evenness of the assemblages I hope to address some of the problems raised by theoretical and ethnographical considerations above.

CHAPTER IV:

COMPARATIVE ANALYSIS OF THE FAUNAL ASSEMBLAGES FROM THREE SITES IN THE VIRGINIA COASPTA PLAIN

The analysis presented below is based on the comparison between three faunal assemblages, two of which have been previously analyzed by other scholars, and one, 44CC35, that was analyzed specifically for the purposes of the present research. The choice of sites for the comparison was greatly limited by the scarcity of the faunal materials from the Coastal Plain area. Both published and grey literature reports were consulted in an attempt to identify previously analyzed sites suited for the present research. Three sites were selected based on their location, settlement type, temporal association, and faunal assemblage size. The sites are 44CC35 from the Chickahominy collection, Maycock's Point (44PG40), and Potomac Creek (44ST2). Despite numerous problems with the comparison between these three assemblages, they were deemed to be the best currently available sites for the purposes of this research. Because of the differences in recovery, identification, and quantification between the assemblages, several assumptions had to be made in the course of the analysis. A detailed description of the specifics of the analysis as well as the discussion of the assumptions follow bellow.

The first assumption addresses the recovery-related biases of the three assemblages. The three assemblages were recovered during different time periods, and the methods used for their recovery were not the same. The biggest concern in this regard is the possible absence of any form of sifting in the 44CC35 excavation. The recovery of 44CC35 materials was ahead of its time in many respects. The fullness of the assemblage

is impressive in comparison with many other faunal materials from the same general geographic area. The fact that several flotation samples were taken in the course of excavation adds to the value of the collected materials. However, it is unclear whether any form of screening was applied to the majority of the faunal materials, which puts into question their representativeness. For the purposes of the present research, it is assumed that despite a possible recovery bias, the 44CC35 assemblage is comparable to its Maycock's Point and the Potomac Creek counterparts. Clearly, as more assemblages are recovered from the Virginia Coastal Plain area using the newest field methodology, the results of the present analysis may be questioned or confirmed with the use of a larger and a less biased dataset.

The 44CC35 faunal remains were analyzed using the standard procedures of the Department of Archaeological Research, Colonial Williamsburg Foundation zooarchaeology lab and recorded in accordance with the guidelines provided in the D.A.R. Faunal Analysis Encoding Manual (Brown and Bowen 2003). When possible each bone was identified to the species level. For each identified fragment the recorded information included the element type, symmetry, identifying features, relative size of the animal, and fusion. For teeth the degree of wear was documented based on the scale described in the manual (Brown and Bowen 2003: 41). The identification of bones was based on Dr. Bowen's faunal comparative collection located at the zooarchaeology laboratory. All recorded information was entered into a database using FoxPro program CWBONE Version 4.12.

The validity of the findings of the analysis presented here will largely depend on the choice of an appropriate quantification method through which a meaningful

comparison between the assemblages can be made. In any faunal analysis, once the bones are recovered, the researcher is faced with a challenge of translating bone fragments into the amount of meat they represent. The most basic measure of taxa abundance is the number of identified specimens (NISP). It is defined as a number of bone fragments "assigned to some taxonomic unit" (Grayson 1984: 17). While this method is a helpful beginning step in quantitative analysis, it is strongly affected by the degree to which bones are fragmented as well as the difference in a number of bones between species. Some animals become underrepresented, while others are over represented in the record, and the comparison between faunal assemblages becomes extremely difficult (Ibid, 21-23).

The minimum number of individuals (MNI) method addresses some of the problem areas of NISP (Ibid, 27). MNI is defined as "the smallest number of individuals represented for each element, taking into consideration differences in age, sex, and size" (Bowen 1996: 92). However, MNI does not tell us about caloric value of animals represented in the bone assemblage. In case of small assemblages it also tends to render the sample too small for any sort of meaningful quantitative analysis.

The minimal useable pounds of meat and the biomass methods are considered to be more accurate estimates for diet reconstruction. The two latest methods are based on establishing a relation between the bone and meat weight, and the biomass method is considered more biologically sound (Reitz et al. 1987: 314). Unlike the meat weight method that relies on establishing an average size of animals within any given taxa, the biomass method is especially accurate and is built on the assumption that "the weight of the bone is proportionate to the amount of flesh it supports" (Ibid.).

The data collected from the 44CC35 faunal assemblages include NISP, MNI, and biomass, and the results are reported in the Appendix A. However, an additional consideration in the comparative analysis between the three sites are the methods used by other scholars in presenting their information. To ensure the evaluation of comparable measures between different assemblages I chose to rely on NISP despite the shortcomings of the method discussed above.

The comparative analysis in zooarchaeology is often problematic because of differences in levels of identification of units of analysis used by different scholars. Several assumptions have to hold true in order for the analysis presented here to be valid. Because of the choice of NISP as the primary quantitative measure on which all the following calculations are made, the first assumption is that the level of fragmentation is the same for all three assemblages. The fragmentation of bones depends on a number of factors including preservation and the method of food preparation. While it is possible that the cooking methods changed over the examined period of time and that the preservation differed between the three sites, for the purposes of this analysis, it is assumed that overall, the number of identified specimens is a sufficient proxy measure of the relative importance of different animals in the diet.

The second assumption addresses the issue of different levels of analysis reported by the three researchers. The data for 44CC35 and Potomac Creek are reported by feature, while Maycock's Point assemblage is broken into levels of the shell midden dating to different time spans within the same broader archaeological period. While I have conducted the feature-level analysis of the three assemblage with the assumption that the levels of the midden can be compared to features, I feel more confident about the results

of the occupation-based analysis that looks at all features of each site that date to the same general time period. The results of both types of the analysis are discussed bellow.

The data from all three assemblages were entered into a database and analyzed with the use of Excel and SPSS (Microsoft Office Excel 2003; SPSS 13.0 for Windows). The richness and evenness for each assemblage were calculated using Kintigh's formula for calculating measures of diversity in archaeological assemblages (Kintigh 1989). Percentages based on NISP were used to trace change in relative importance of deer over time. Only the numbers of specimens identified to the species level were used in the analysis to ensure the most accurate comparison between the assemblages. Dogs, rats, and small reptiles (frogs and snakes) were evaluated as commensals and were excluded from the quantitative analysis.

In the calculation of evenness the assemblages were divided into four animal groups: deer, small mammal, turtle, bird, and fish. These groups were considered meaningful for answering the research questions at hand. Each group has a distinct method of procurement associated with it, and in most cases a particular season during which it is most abundant. There is a possibility that some of the observed differences between the three assemblages are due to the degree of settlement permanence at each site. The Maycock's shell midden dating to Middle Woodland presents the biggest concern in terms of the time of the year it represents. According to one publication, Barber (1981) argues for a year-round occupation of the site, while in a later analysis the author states that Maycock's Point was intensively occupied in spring and served as a "transient stop-over" during the rest of the year (Barber 2005: 10). While certain differences between the assemblages may have resulted from the difference in permanence of each settlement

and thus from the different parts of the year represented by each, for the purposes of the present analysis, it is assumed that the assemblages represent comparable accumulations of bones.

While the division into four groups may not allow a detailed seasonal comparison, it gives a sense of relative importance of various animal resources for the whole year. The relative importance of deer that is central to the present analysis can be contrasted with the relative importance of other resources. The question of garden hunting requires special consideration in terms of the four identified animal groups and the importance of deer. While the methods of deer hunting most frequently described in the historical accounts include stalking and deer drives, it is important to remember that some deer may have been killed by boys guarding the gardens from various pests, and thus would form a portion of meat acquired through garden hunting. Therefore the identification of the exact proportion of species that contribute to the garden hunting meat is problematic. Because there is currently no method that allows the distinction between the deer meat acquired through the two different methods, it is assumed for the purposes of the present research that all deer meat was acquired through the methods other than garden hunting. Future research may allow for such distinction to be made based on differential butchery or possibly other characteristic that will allow to correct for the resulting error.

While evenness was calculated based on the four broad animal groups, richness was based on the exact number of species present in each assemblage. The assumption was made that the three researchers identified the bones to the same level of specificity that would allow for a valid comparison. The 44CC35 assemblage contained two features that differed in their method of recovery, which resulted in an inherently higher richness.

The first feature included a flotation sample that provided valuable information about the true diversity of the assemblage, while the other contained materials preserved inside a turtle shell resulting in a similar sample. In order to ensure a more even comparison, the two samples were excluded from the richness analysis. However, the identification results are discussed in other portions of the study as they provide an invaluable insight into the contents of the Late Woodland diet.

The main focus of the analysis presented here is a Late Woodland site 44CC35 that was analyzed by the author in the summer of 2005. The research was facilitated by the CWF zooarchaeological lab and greatly aided by Dr. Joanne Bowen and the lab staff. After a careful examination of published materials as well as materials on file at the Department of Historic Resources in Richmond, Virginia, two sites were selected for the analysis in order to place 44CC35 into a proper temporal and cultural context. The search for previously-analyzed and well-documented faunal assemblages from the Coastal Plain area yielded a disappointingly small number of sites to choose from. Maycock's Point and Potomac Creek sites were chosen because of their chronology and the large faunal assemblages yielded by their excavation. The location of the three sites within the same physiographic province and in similar environmental settings, close to rivers and creeks, helps limit the influence of spatial variability on the comparison and allows the research to focus on change in Virginia Algonquian speakers' life ways over time (Fig. 2).

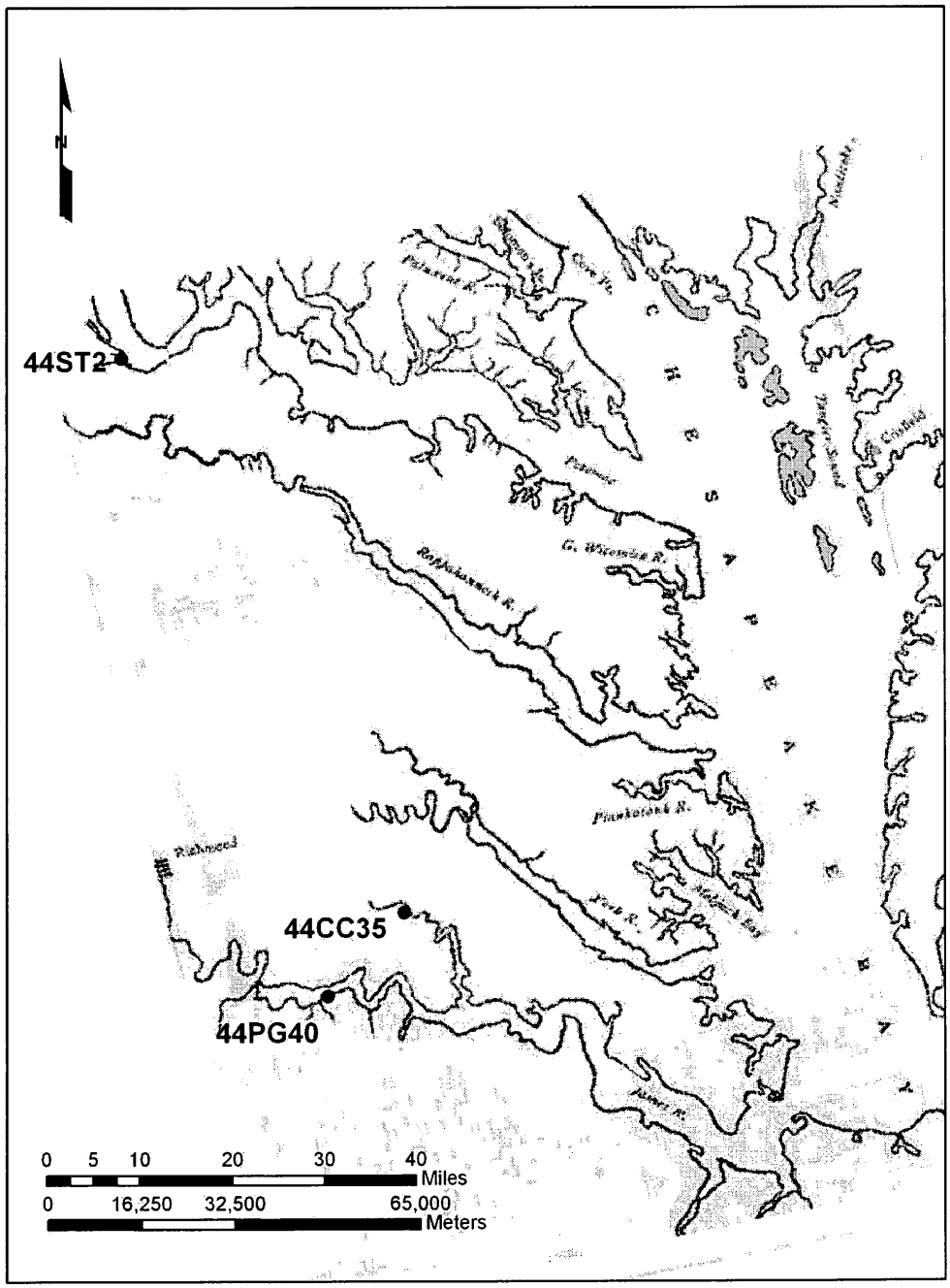

Figure 1. 44PG40, 44CC35, and 44ST2, Location of sites included in the analysis.

44CC35

44CC35 is one of the sites that was excavated during a four-year project, starting in 1967 whose goal was to determine the validity of John Smith and Zuniga maps in locating Native American village sites in Virginia (McCary and Barka 1977: 73). The site was recently relocated during a survey by Brendan Burke (Fig. 3)

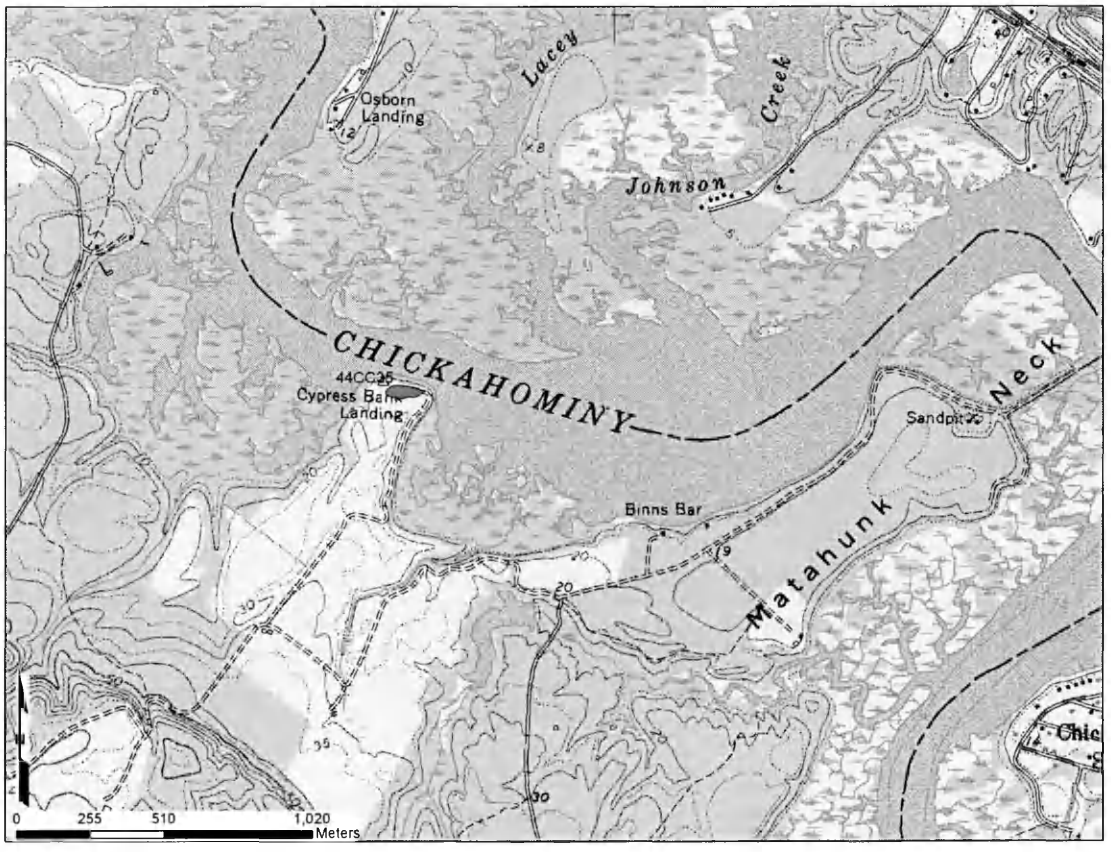

Figure 2. 44CC35, Location on the USGS 7.5' Walkers Quadrangle.

A great variety of both organic and inorganic materials were recovered, and the collection is currently under study at the college of William and Mary. 44CC35 was dated using both C 14 dating method and Klein's method based on the Native ceramics sequence (Klein 1994). The date for the majority of the features at the site was determined to be

ca. 1200 AD according to both dating methods. Most of the features at the site were determined to be pit features and provided materials that were remarkably well-preserved for the Coastal Plain area. Despite a small assemblage size, the analysis of the site is an important contribution to the understanding of the cultural landscape of the Virginia Coastal Plain area that is generally poor in animal remains for both cultural and preservation reasons.

MAYCOCK'S POINT

Maycock's Point is a Middle Woodland shell midden on the James River (Fig. 4).

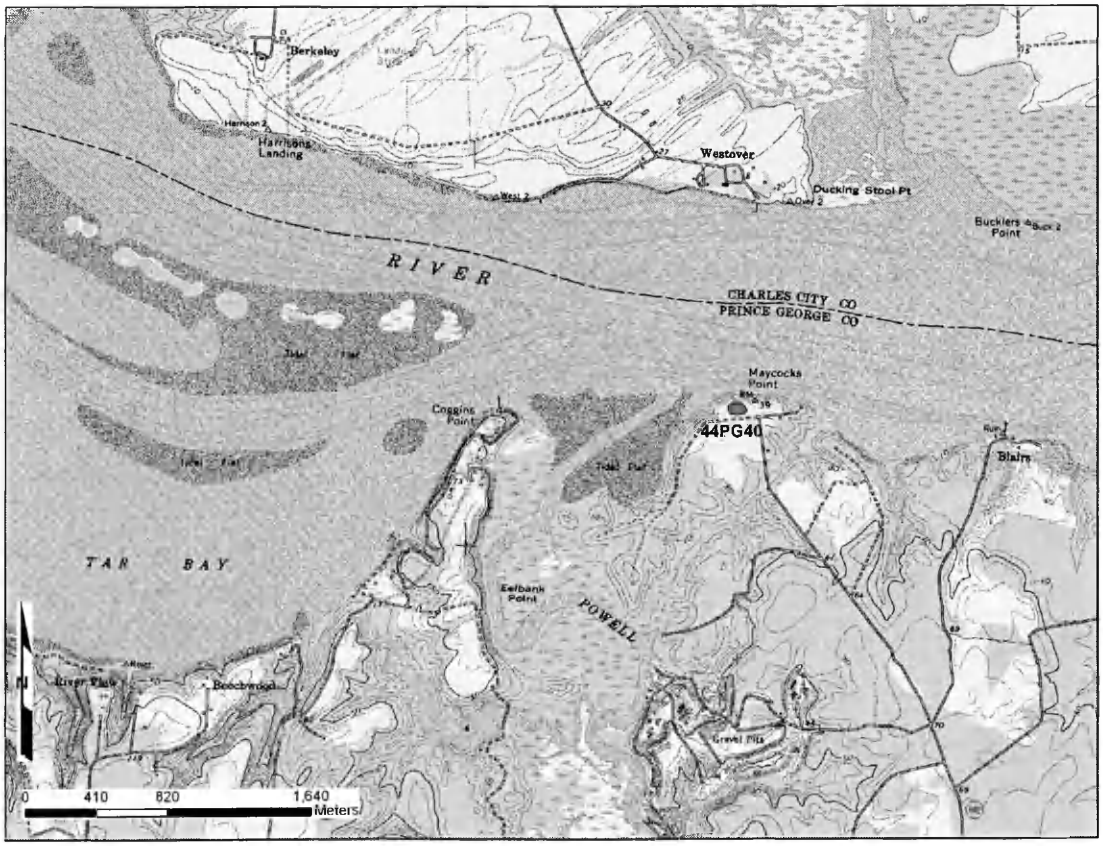

Figure 3. 44PG40, location on the USGS 7.5' Westover Quadrange.

The midden contained a large faunal assemblage analyzed by Michael Barber (Barber 1981, Barber 2005). The midden was excavated in six stratigraphic levels, four of which were chosen for the present comparison since they contained faunal materials and were dated to different time periods within the Middle Woodland. The location of the site within the same physiographical province as CC 35, the similarity in wild resource availability and its early placement in the temporal sequence make it a great candidate for comparison with the purpose of identifying and analyzing the temporal trends in the human-animal relationships.

POTOMAC CREEK

Potomac Creek site is the northernmost site included in the analysis. It is located at the confluence of Potomac Creek and Potomac River (Fig. 5) and represents a later stage in the life of Virginia Algonquians.

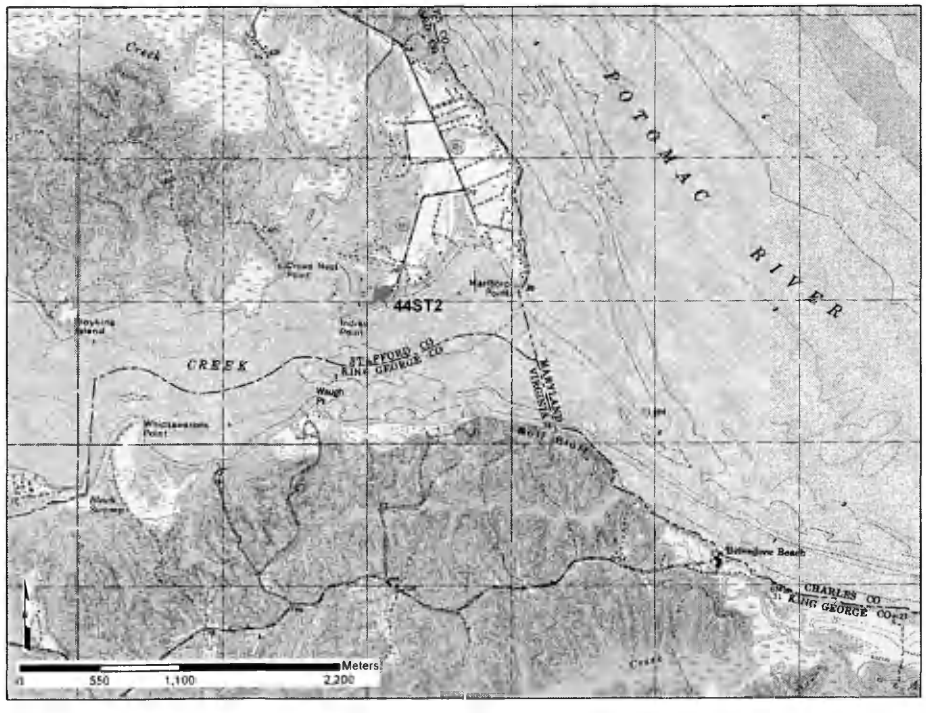

Figure 4. 44ST2 location on the USGS 7.5' Passapatanzy Quadrangle.

Like most sites in the area it represents multiple occupations, some of which date to the period in the end of Late Woodland and are of special interest here. The faunal assemblage was analyzed by Gwenyth Duncan and reported by feature, which makes it especially helpful for placing CC35 in a proper context. Potomac Creek was excavated by WMCAR in 1996-1997 and determined to be a palisade village site, a quite different form settlement than CC35 and Maycock's Point (Duncan 1999: C-3). The site's location, clearly determined chronology and a large faunal assemblage yielded by the excavation were determining factors in choosing it as a representative of the latest period considered in the present analysis.

In order to test the hypothesis outlined above, the three assemblages were compared using several types of calculations and two levels of analysis. Richness and evenness were calculated both for each feature (midden level for Maycock's Point) and for the whole occupation of each site. An occupation was defined as an accumulation of features dating to the same time period. In the occupation-level analysis Maycock's Point represents Middle Woodland, while CC 35 and Potomac Creek – Late Woodland I and Late Woodland II respectively. The main measures that were used to identify any trends of change over time were richness, evenness, and relative percentage of different animals in the diet. The results varied slightly depending on the level of analysis for reasons that will be discussed below.

The feature level analysis was conducted to provide comparable sample sizes for the three sites under consideration. Unlike the occupation level analysis with the sample size of 3 sites, feature level analysis could be subjected to quantitative methods of comparison between the assemblages. All cases with the faunal total less than 10 were excluded from

the analysis. The analysis revealed several trends of change in animal use over time. The most revealing patterns in terms of the present research are those of measures of diversity of the three assemblages (Fig. 6-8) and relative contributions of deer, small mammals, and birds to the diet (Fig. 9-14).

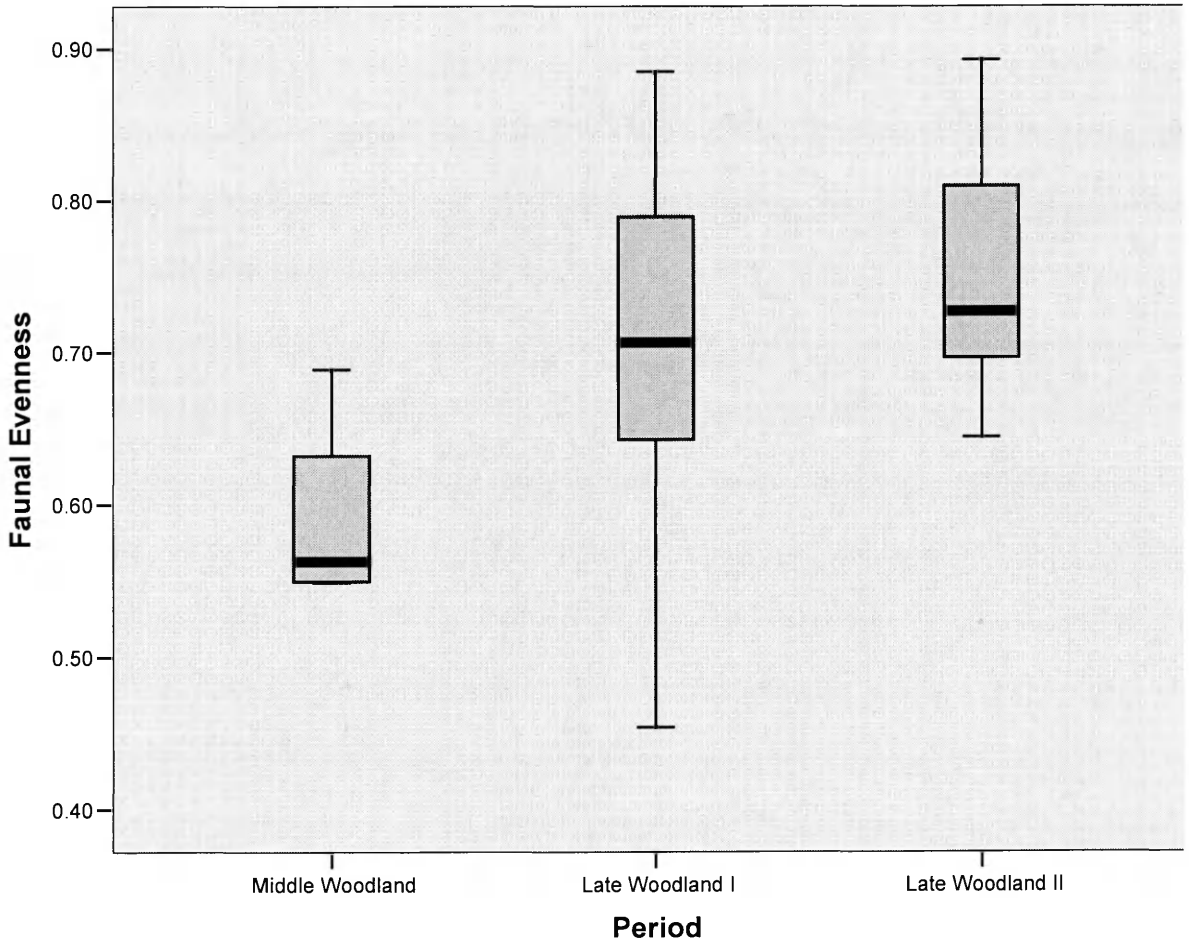

Figure 5. Faunal evenness.

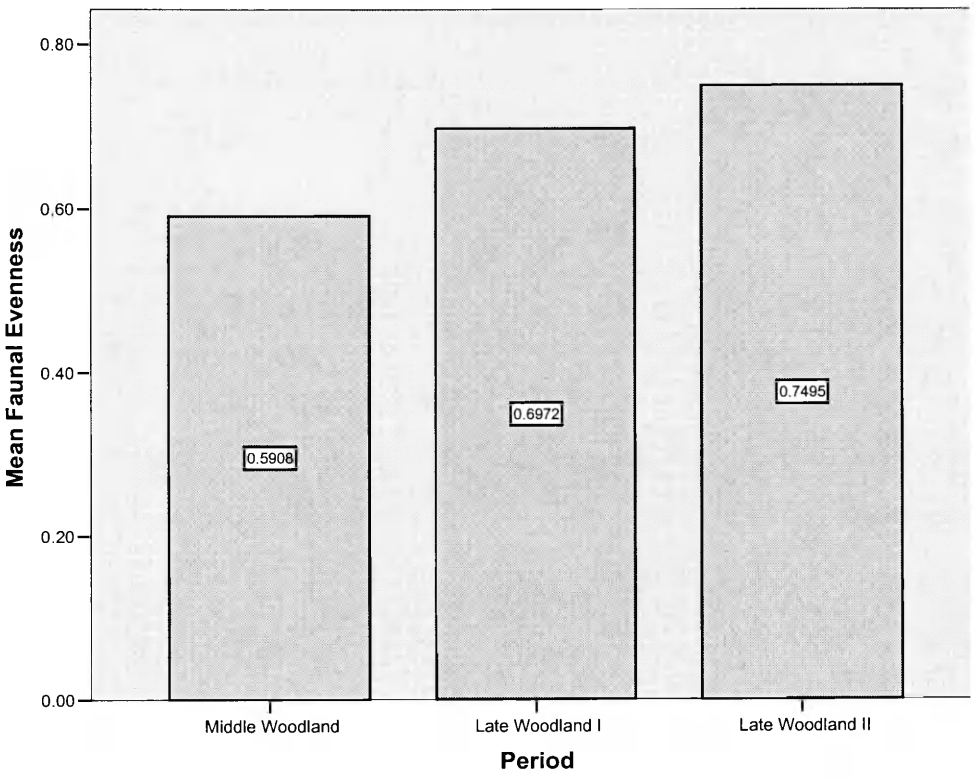

Figure 6. Change in faunal evenness over time.

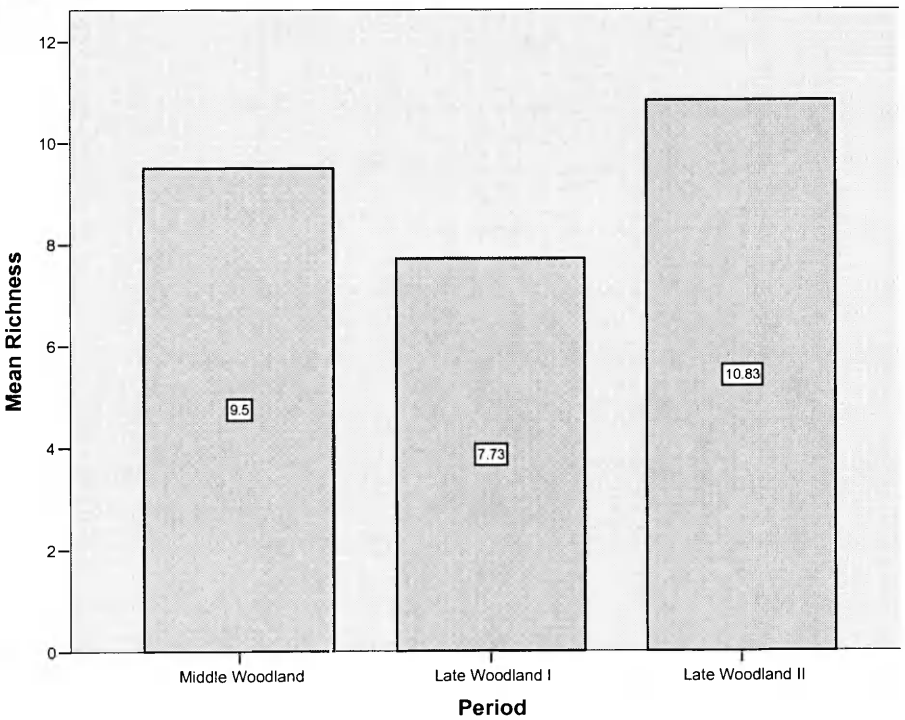

Figure 7. Change in faunal richness over time.

While the faunal richness appears to fluctuate over time, one has to be very careful when interpreting the emerging pattern. The pattern mimics fluctuations in the sample size and may be better evaluated on the occupation than on the feature level of analysis. The evenness of the three assemblages shows a gradual increase over time. Using Drennan's (1996:163) criteria for evaluating results of the analysis, a one way analysis of variance indicates that the mean evenness of faunal utilization was not very likely to remain constant over time ($p=.114$, $F=2.459$, $n1=4$, $n2=11$, $n3=6$). Sheffe Post hoc test indicates that the difference was the greatest between the Middle Woodland assemblage and the two Late Woodland assemblages. The pattern represents utilization of the same animal species with increasing evenness in distribution. In order to understand the contributing constituents of the change in evenness, we have to consider the animal groups individually.

Several patterns have emerged from examining each group of species individually. The most relevant patterns to the present discussion are displayed graphically in form of box plots and bar graphs (Fig. 9-16). The box plots show variance in each assemblage, while the bar graphs allow envisioning the patterns more clearly. The percentage of deer in the diet decreased, the percentage of fish increased, turtle percentage fluctuated rising in the Late Woodland I and decreasing in the Late Woodland II, while the percentage of small mammals and birds increased in the Late Woodland I and Late Woodland II respectively.

The most important graphs to consider are those of deer, small mammal, and bird percentage at the three sites. While the deer is the focus of the present discussion, the importance of small mammals and birds is especially relevant for testing the garden

hunting hypothesis.

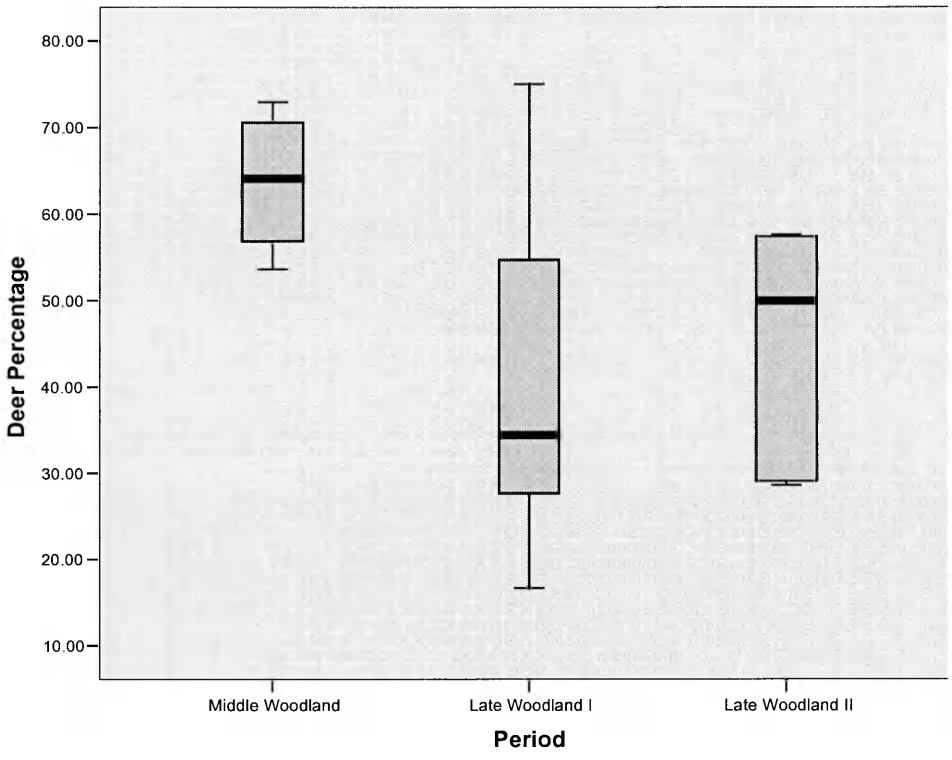

Figure 8. Deer percentage.

The box plot (Fig. 9) shows the change of deer importance relative to other meat sources over time. All cases with the faunal total of less than 10 were eliminated for this graph. The graph reveals that the largest difference between the two Late Woodland sites and the Middle Woodland site. When the mean deer percentages are considered (Fig. 10), the same pattern is presented in a different way showing a sharp decrease of deer in the diet between Middle Woodland and Late Woodland I, and a slight increase between Late Woodland I and Late Woodland II. It is interesting, however, that despite a slight increase, the mean percentage of deer in diet in the Late Woodland II seems considerably lower than in the Middle Woodland.

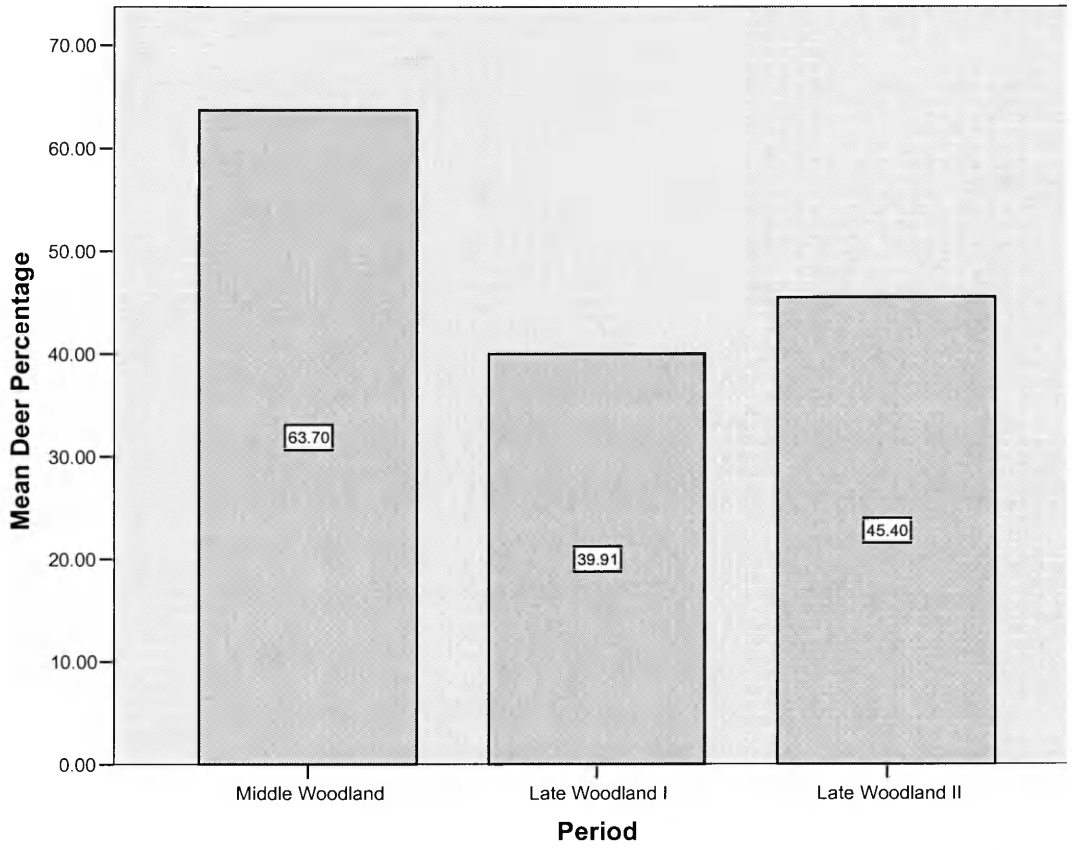

Figure 9. Change in mean deer percentage over time.

A one-way analysis of variance indicates that it is fairly unlikely that the mean percentage of deer in the diet remained the same ($p=.067$, $n1=11$, $n2=6$, $n3=4$). Scheffe Post hoc test indicates that the difference is the greatest between the Middle Woodland and the two Late Woodland assemblages.

In order to understand the pattern that appears from the analysis of the deer percentage in the diet, the graphs showing the change in contribution of other animals to the meat are constructed. The small mammal percentage appears to increase in the Late Woodland I period and decrease again in the Late Woodland II (Fig. 11-12). The graphs exclude all features with the faunal total less than 10 as well as one outlier in the CC 35

assemblage that contained 12 bone fragments total, with an unusually high percentage of small mammals.

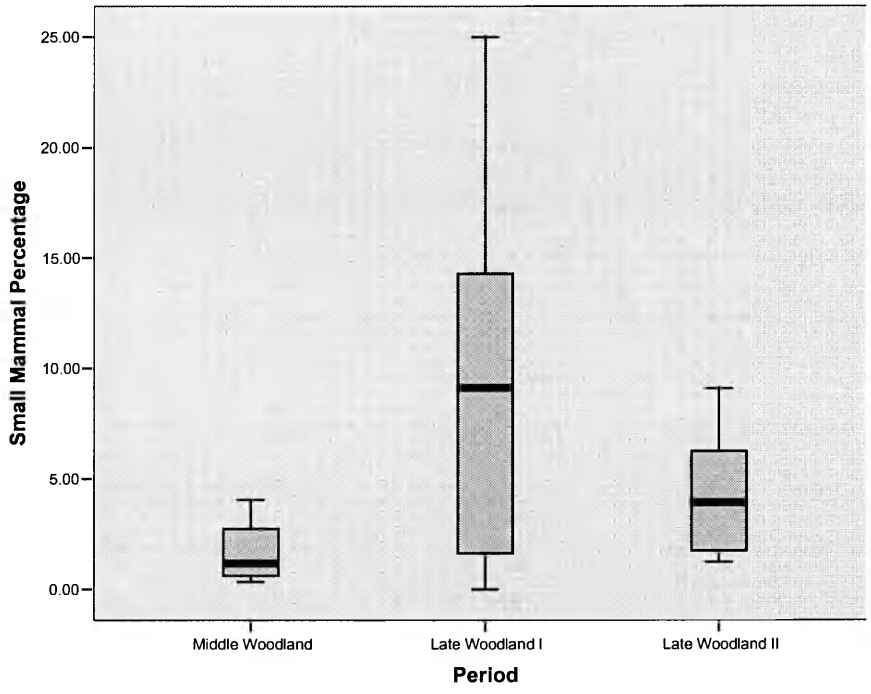

Figure 10. Small mammal percentage.

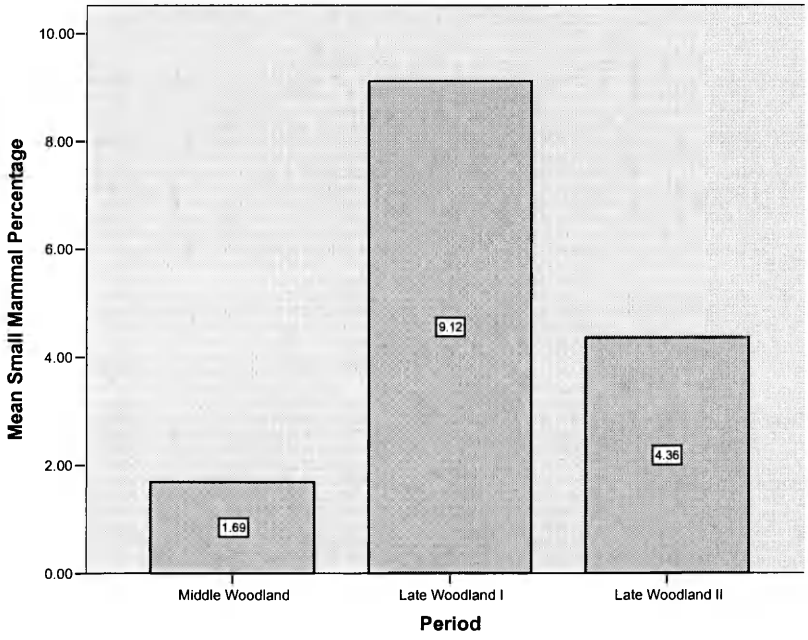

Figure 11. Change in small mammal percentage over time.

While small mammal percentage increased in the Late Woodland I period, the percentage of birds in the diet increased dramatically in the Late Woodland II (Fig. 13-14). All cases with the faunal total of less than 10 were excluded from the analysis. There are several outliers in the Late Woodland I and II assemblages. However, their exclusion yields additional outliers gradually reducing the sample size and making any meaningful evaluation of the pattern impossible. Therefore the outliers are included in the graphs.

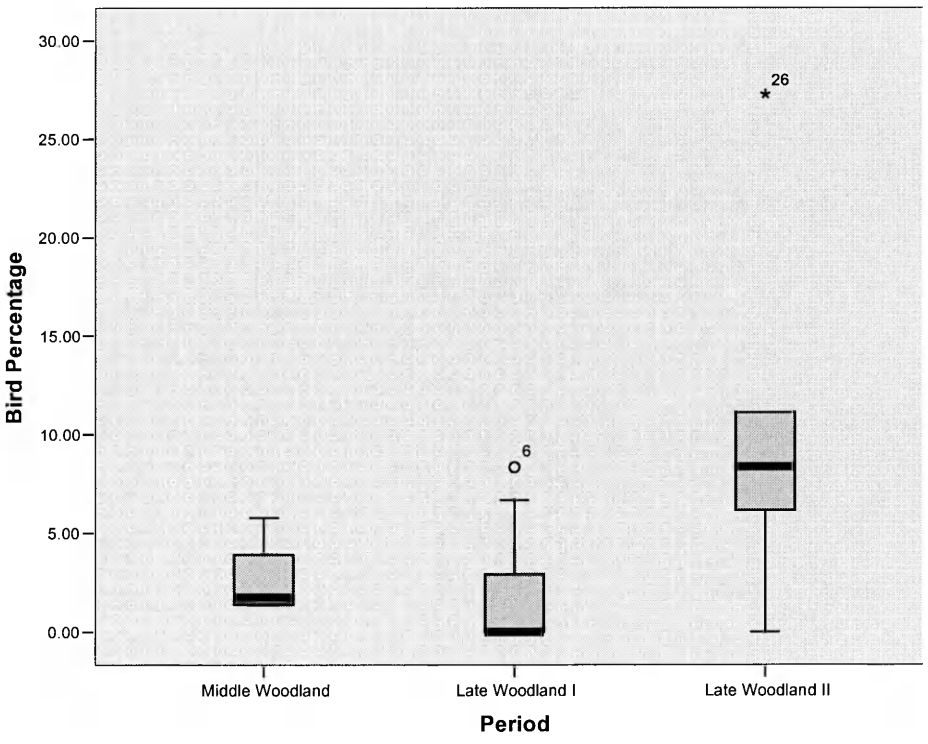

Figure 12. Bird percentage.

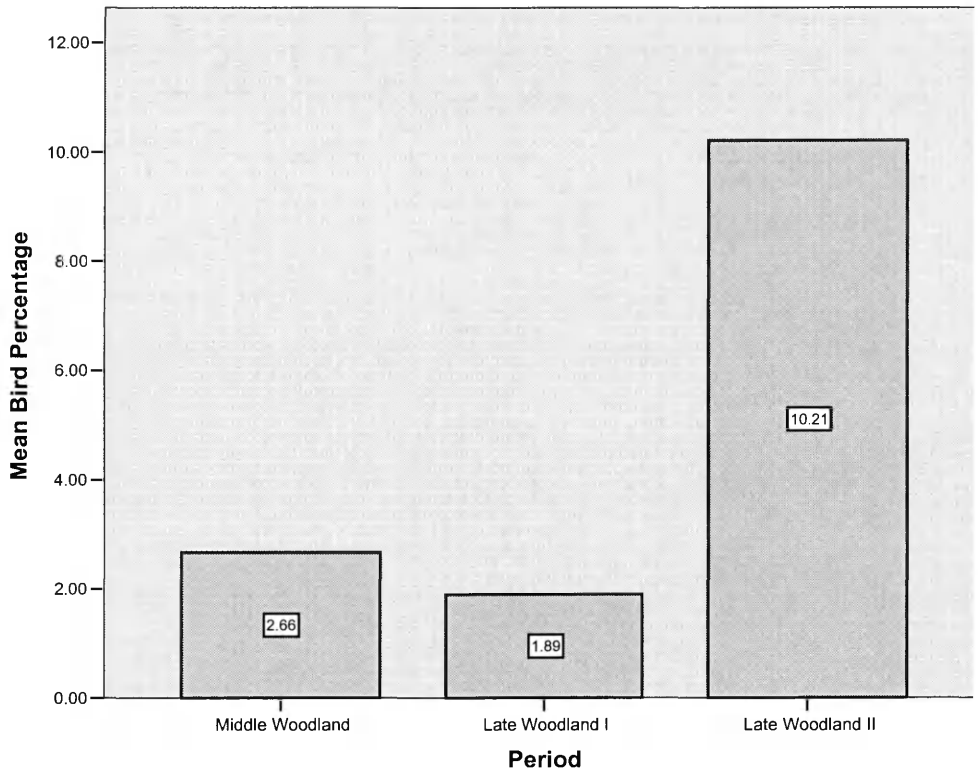

Figure 13. Change in mean bird percentage over time.

While the level of fish exploitation is not directly related to the hypothesis in question, it may potentially influence the observed patterns as it contributes to the calculations of the total number of bones in each assemblage. The level of fish contribution to the diet gradually increases over time (Fig 15-16). The increase is very gradual between Middle Woodland and Late Woodland I and becomes sharper between Late Woodland I and Late Woodland II. Unlike the other patterns of faunal exploitation considered in the analysis above, the fish percentage pattern indicates the largest difference between the two Late Woodland assemblages.

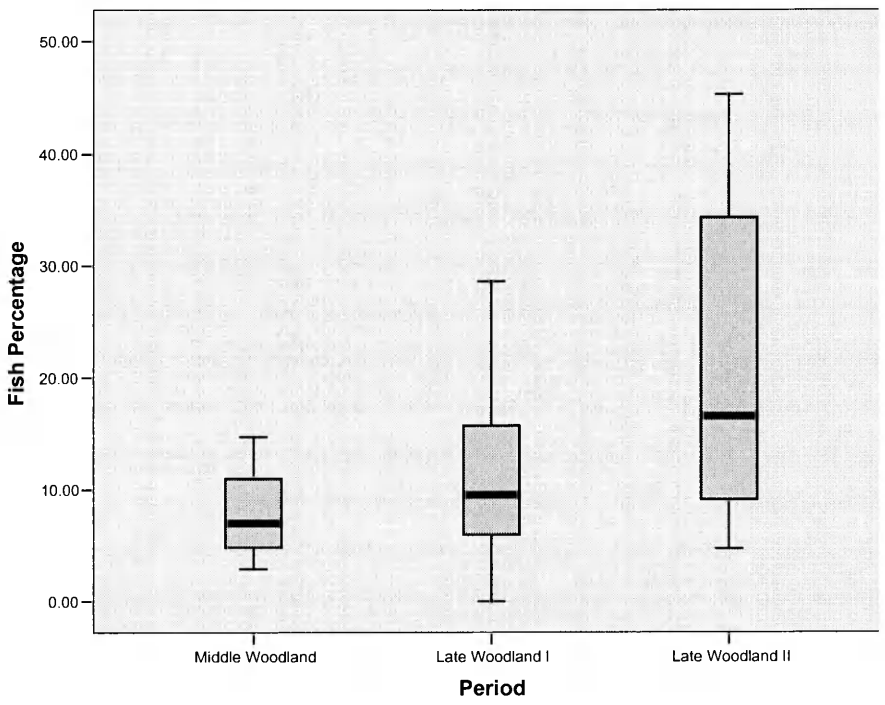

Figure 14. Fish percentage.

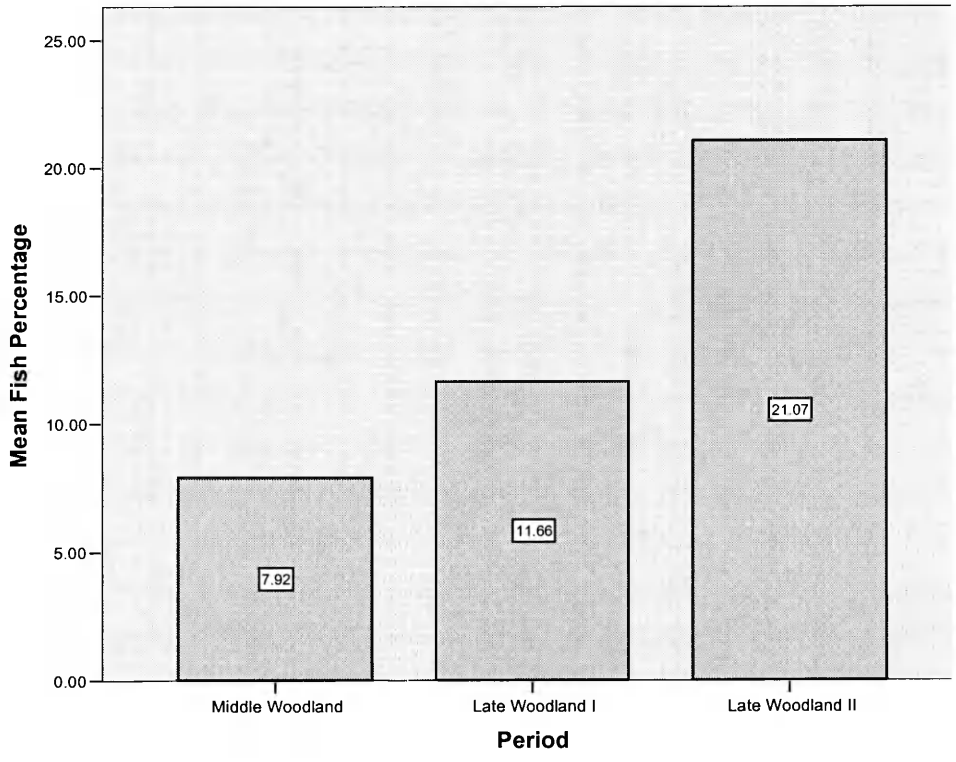

Figure 15. Change in fish percentage over time.

The occupation level analysis results are summarized in Table 1. Most patterns are the same or similar to the ones discussed above. Because of the small sample size (3 sites) this section will contain statements of qualitative rather than quantitative nature. The occupation level of analysis allows us to minimize the bias resulting from the comparison of features that differ greatly in size and type. The analysis shows that the percentage of deer relative to other meat sources decreases in Late Woodland I and increases slightly in Late Woodland II. However, it does not reach the level of importance of the Middle Woodland period. The overall decrease in deer contribution to the diet is accompanied by an increase in faunal evenness. As in the feature level analysis, the percentage of small mammals and birds increases in Late Woodland I and Late Woodland II respectively. The fact that the same patterns appear on this level of analysis strengthens the results of the feature level analysis.

TABLE 1

SUMMARY OF THE OCCUPATION LEVEL ANALYSIS

	PG40 (Middle Woodland)	CC35 (Late Woodland I)	ST2 (Late Woodland II)
Deer %	62.66055	44.3418	52.71619
Turtle %	20.6422	34.18014	17.96009
Fish %	11.46789	11.54734	20.67627
Bird %	4.220183	2.078522	6.929047
Small Mammal %	1.009174	7.852194	1.718404
Faunal Richness	13	14	22
Faunal Evenness	0.65	0.78	0.76

The two levels of analysis show several trends of change in faunal exploitation pattern over time. While deer remains to be main source of meat in all three periods,

there are slight fluctuations in the importance of other meat sources that become increasingly important supplements to the diet. Late Woodland I shows an increasing importance of small mammals, while Late Woodland II is characterized by a growing importance of birds. The majority of birds identified in the Late Woodland II assemblages are turkeys, while small mammals in the Late Woodland I include squirrels, opossums, raccoons, otters, and muskrats. Both turkeys and the majority of small mammals are considered garden hunting species or can be trapped without interfering with crop tending activities. An increase in their utilization may be attributed to the shifts in social life of a more sedentary community that relies increasingly on the cultivated crops.

While the faunal evidence offers some support to the garden hunting hypothesis, it does not conclusively prove that it was the exact nature of change in the hunting practices in the Late Woodland period. An excavation bias may have exaggerated the existing pattern making it difficult to draw stronger conclusions. While the data do not support an increase in the frequency of deer drives, they are insufficient to reject the deer drive hypothesis. A closer examination of the importance of deer drives should focus on the fall season when most of the deer drives are reported to take place during the Contact period. Another related question that cannot be addressed with the present materials is the herd management during deer drive events. While the three assemblages do not contain enough bones to determine the sex and age of the hunted animals, a larger faunal assemblage containing mandibles and innominate bones can help detect any selective hunting practices used by Algonquian speakers in the region in different time periods. Just because the white-tailed deer were not domesticated in the most widely accepted

meaning of the term (see for example Rindos 1984; Smith 2001), does not mean that there was no variation in the pattern of their exploitation both spatially and temporally. Other regions such as the broader Eastern Woodlands and Northern Mexico where the white tailed deer contributed greatly to the diet, provide a great base for comparison as archaeologists gain a better understanding of the Coastal Plain physiographic province.

CHAPTER V:

CONCLUSION

Before European settlers set foot in Chesapeake Bay with their livestock, and long before pork became affectionately known as "vitamin P" of Virginia, there were deer. These incredibly resilient animals became a focal point of a very sophisticated foodways system for numerous Algonquian speaking groups in the Coastal Plain region. While the deer remained the main source of meat for thousands of years, its use fluctuated over time in terms of intensity relative to other components of the Native Virginians' diet. Despite numerous unavoidable biases of the faunal materials analyzed in the present study, it contributes to the understanding of the enduring yet dynamic relationship with the white-tailed deer. The deer are presented not only as an invaluable resource for Virginia Indians, but also as living beings and active participants in the formation of the complex web of human animal relationships.

The present study set out to challenge some of the assumptions in the archaeological literature concerning the nature of human-animal relationships in prehistoric Coastal Plain of Virginia. Some of the recent archaeological studies in the area have provided a rich social background for the study and have allowed an in-depth discussion of issues related to the hunting practices associated with the transition to a more intense form of plant cultivation. Using anthropological theory in combination with archaeological and ethnohistoric information, I have suggested two possible directions for change in human-animal relationships in the Late Woodland period. It is important to note that the two hypotheses were not mutually exclusive, and the faunal data available for analysis were better suited to test the garden hunting than the deer drive hypothesis.

Rather than simply stating that the deer were the main source of meat, as many previous faunal studies have done, the present research takes a step further and examines deer in relation to other contributing animals. By considering richness and evenness of the three faunal assemblages from the different time periods, it is possible to detect several trends in the diet change. The decrease in deer percentage, the increase in small mammal consumption in the Late Woodland I, and an increase in the consumption of wild turkeys in Late Woodland II suggest a possibility of the introduction of garden hunting, as both small mammals and turkeys are considered garden hunting species. The question of frequency of deer drives remains unanswered and presents an interesting problem for a future study that should rely on larger less biased faunal assemblages.

The question of domestication has been a major departing point for the theoretical discussion in the study. The inclusion of deer in this discussion requires a broader definition of domestication that allows us to look beyond morphological changes and all-encompassing control of humans over animals. Rather than drawing a sharp distinction between foragers and farmers, it is useful to adopt Terrell et al.'s focus on domesticated landscapes and "diversity of human subsistence practices" (Terrell et al. 2003: 347). While the faunal evidence considered in the study is merely suggestive of the garden hunting introduction, there is a clear trend of increasing diversity of faunal exploitation over time demonstrated by fluctuations in richness and evenness of the assemblages. The growing reliance on a wider range of sources indicates a shift in Virginia Indians' relationship with their domesticated landscape. While the current study may have raised more questions than it has answered, it provides a foundation for future investigations. By addressing a question of human-animal relationships in prehistoric Virginia, the study

contributes to the overall understanding of Virginia prehistory as well as lays out a basis for studying changes that affected these relationships in the later historical period.

While the results of the present analysis are subject to change as less biased data sets become available for consideration, it demonstrates the potential of the faunal assemblages excavated in accordance with the latest field methodology for addressing complex questions about the past cultural practices. There is currently a great need for Coastal Plain faunal assemblages that are comparable in their richness to the Potomac Creek site. Sadly, the preservation bias is not the only reason for the dearth of faunal materials in the region, and it is my hope that zooarchaeolgoical investigations continue to grow in importance as they hold a key to understanding human-animal relationships, a vital component of past and present cultures.

APPENDIX A

44CC35 SUMMARY OF FAUNAL REMAINS

SITE 44CC35
SUMMANRY OF FAUNAL REMAINS

	NISP		MNI		Meat Weight		Biomass	
	No.	Pct.	MNI	Pct.	Lbs.	Pct.	Kg	Pct.
Class Osteichthyes (Bony Fish)	356	17.7	0	0.0	0.0	0.0	0.12	0.5
Acipenser spp. (Sturgeon)	15	0.7	1	2.6	100.0	12.5	0.20	0.8
cf. Acipenser spp. (Sturgeon)	2	0.1	0	0.0	0.0	0.0	0.05	0.2
Lepisosteus spp. (Gar)	26	1.3	1	2.6	5.0	0.6	0.08	0.3
Order Clupeiformes (Herring, Shad, or Anchovy)	2	0.1	0	0.0	0.0	0.0	0.00	0.0
Family Catostomidae (Sucker)	5	0.2	1	2.6	1.0	0.1	0.01	0.0
cf. Family Catostomidae (Sucker)	2	0.1	0	0.0	0.0	0.0	0.01	0.0
Family Ictaluridae (Freshwater Catfish)	58	2.9	4	10.5	8.0	1.0	0.13	0.5
cf. Family Ictaluridae (Freshwater Catfish)	2	0.1	0	0.0	0.0	0.0	0.01	0.0
Perca flavescens (Yellow Perch)	2	0.1	0	0.0	0.0	0.0	0.00	0.0
Lepomis spp. (Sunfish)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
cf. Lepomis spp. (Sunfish)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
Micropterus spp. (Bass)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
Morone americana (White Perch)	4	0.2	0	0.0	0.0	0.0	0.00	0.0
cf. Morone americana (White Perch)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
cf. Family Amiidae (Bowfin)	4	0.2	1	2.6	0.0	0.0	0.07	0.3
Order Anura (Toad or Frog)	24	1.2	0	0.0	0.0	0.0	0.00	0.0
Class Reptilia (Reptile)	3	0.1	0	0.0	0.0	0.0	0.00	0.0
Order Testudines (Turtle)	146	7.2	0	0.0	0.0	0.0	0.50	2.0
Chelydra serpentina (Snapping Turtle)	16	0.8	2	5.3	20.0	2.5	0.24	0.9
cf. Chelydra serpentina (Snapping Turtle)	7	0.3	0	0.0	0.0	0.0	0.09	0.4
Family Kinosternidae (Musk or Mud Turtle)	64	3.2	3	7.9	1.2	0.2	0.27	1.1
cf. Family Kinosternidae (Musk or Mud Turtle)	5	0.2	0	0.0	0.0	0.0	0.06	0.2
Family Emydidae (Box or Water Turtle)	27	1.3	0	0.0	0.0	0.0	0.21	0.8
cf. Family Emydidae (Box or Water Turtle)	2	0.1	0	0.0	0.0	0.0	0.01	0.1
Chrysemys spp. (Slider or Cooter)	15	0.7	3	7.9	9.0	1.1	0.28	1.1
cf. Chrysemys spp. (Slider or Cooter)	5	0.2	0	0.0	0.0	0.0	0.08	0.3
Terrapene carolina (Box Turtle)	43	2.1	3	7.9	0.9	0.1	0.73	2.9
cf. Terrapene carolina (Box Turtle)	4	0.2	0	0.0	0.0	0.0	0.06	0.2
Clemmys insculpta (Wood Turtle)	2	0.1	1	2.6	0.0	0.0	0.04	0.2
Family Colubridae (Snake)	5	0.2	0	0.0	0.0	0.0	0.00	0.0
Class Aves (Bird)	22	1.1	0	0.0	0.0	0.0	0.17	0.7
Class Aves/Mammalia III (Bird/Small Mammal)	27	1.3	0	0.0	0.0	0.0	0.07	0.3
Class Aves (Wild Bird) (Wild Bird)	2	0.1	0	0.0	0.0	0.0	0.01	0.1
Duck spp. (Duck)	1	0.0	1	2.6	2.0	0.3	0.01	0.0
cf. Duck spp. (Duck)	1	0.0	0	0.0	0.0	0.0	0.01	0.0
Goose spp. (Goose)	1	0.0	1	2.6	7.0	0.9	0.02	0.1
Meleagris gallopavo (Turkey)	6	0.3	1	2.6	7.5	0.9	0.07	0.3
Class Mammalia (Mammal)	208	10.3	0	0.0	0.0	0.0	1.24	4.9
Class Mammalia I (Large Mammal)	2	0.1	0	0.0	0.0	0.0	0.05	0.2
Class Mammalia II (Medium Mammal)	373	18.5	0	0.0	0.0	0.0	6.37	25.0
cf. Class Mammalia II (Medium Mammal)	2	0.1	0	0.0	0.0	0.0	0.05	0.2
Class Mammalia III (Small Mammal)	53	2.6	0	0.0	0.0	0.0	0.10	0.4

Didelphis virginiana (Opossum)	2	0.1	1	2.6	8.0	1.0	0.44	1.7
Sylvilagus spp. (Cottontail)	1	0.0	0	0.0	0.0	0.0	0.01	0.0
Sciurus spp. (Squirrel)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
cf. Sciurus spp. (Squirrel)	2	0.1	0	0.0	0.0	0.0	0.01	0.0
Sciurus carolinensis (Eastern Gray Squirrel)	4	0.2	1	2.6	1.0	0.1	0.02	0.1
cf. Sciurus carolinensis (Eastern Gray Squirrel)	7	0.3	0	0.0	0.0	0.0	0.03	0.1
Castor canadensis (Beaver)	5	0.2	1	2.6	25.0	3.1	0.26	1.0
Family Cricetidae (Mouse, Rat, Lemming, or Vole)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
Ondatra zibethica (Muskrat)	14	0.7	2	5.3	4.0	0.5	0.12	0.5
Order Carnivora (Carnivore)	1	0.0	0	0.0	0.0	0.0	0.01	0.0
Canis spp. (Dog or Wolf)	5	0.2	0	0.0	0.0	0.0	0.69	2.7
cf. Canis spp. (Dog or Wolf)	1	0.0	0	0.0	0.0	0.0	0.04	0.1
Canis familiaris (Dog)	39	1.9	2	5.3	0.0	0.0	1.50	5.9
cf. Canis familiaris (Dog)	3	0.1	0	0.0	0.0	0.0	0.12	0.5
cf. Canis lupus (Gray Wolf)	1	0.0	1	2.6	66.5	8.3	0.10	0.4
Procyon lotor (Raccoon)	7	0.3	1	2.6	15.0	1.9	0.15	0.6
cf. Procyon lotor (Raccoon)	1	0.0	0	0.0	0.0	0.0	0.00	0.0
Lontra canadensis (River Otter)	1	0.0	1	2.6	17.0	2.1	0.02	0.1
Order Artiodactyla I (Sheep, Goat, Deer, or Pig)	6	0.3	0	0.0	0.0	0.0	0.26	1.0
cf. Order Artiodactyla I (Sheep, Goat, Deer, or Pig)	1	0.0	0	0.0	0.0	0.0	0.07	0.3
Order Artiodactyla II (Sheep, Goat, or Deer)	11	0.5	0	0.0	0.0	0.0	0.15	0.6
Sus scrofa (Domestic Pig)	1	0.0	0	0.0	0.0	0.0	0.01	0.0
Family Cervidae (Deer or Antelope)	1	0.0	0	0.0	0.0	0.0	0.15	0.6
Odocoileus virginianus (White-Tailed Deer)	144	7.1	5	13.2	500.0	62.6	7.83	30.7
cf. Odocoileus virginianus (White-Tailed Deer)	48	2.4	0	0.0	0.0	0.0	2.12	8.3
Subphylum Vertebrata (Other Vertebrate)	161	8.0	0	0.0	0.0	0.0	0.00	0.0
Fish	482	23.9	8	21.1	114.0	14.3	0.68	2.7
Reptiles/Amphibians	368	18.2	12	31.6	31.1	3.9	2.58	10.1
Wild Birds	2	0.1					0.01	0.1
Wild Mammals	225	11.2	11	28.9	632.5	79.3	11.14	43.7
Domestic Birds	6	0.3	1	2.6	7.5	0.9	0.07	0.3
Domestic Mammals	1	0.0					0.01	0.0
Commensals	57	2.8	4	10.5	4.0	0.5	1.74	6.8
Wild	1077	53.4	31	81.6	777.6	97.4	14.41	56.5
Domestic	7	0.3	1	2.6	7.5	0.9	0.08	0.3
Identified	808	40.1	38	100.0	798.1	100.0	17.35	68.0
Unidentified	1209	59.9	0	0.0	0.0	0.0	8.17	32.0
Totals	2017	100.0	38	100.0	798.1	100.0	25.52	100.0

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