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Dietary Bioarchaeology: Late Woodland Subsistence within the Coastal Plain of Virginia

Berek J. Dore

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Dietary Bioarchaeology: Late Woodland Subsistence within the
Coastal Plain of Virginia

Berek J. Dore II

Richmond, VA

Bachelor of Science, Virginia Commonwealth University, 2006

A Thesis Presented to the Graduate Faculty of the College of William and Mary
in Candidacy for the Degree of Master of Arts

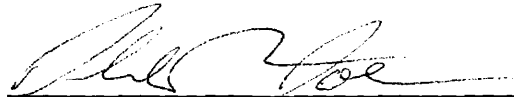
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the requirements for the degree of

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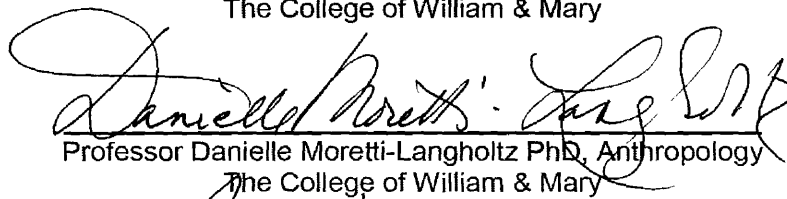


Berek J. Dore II

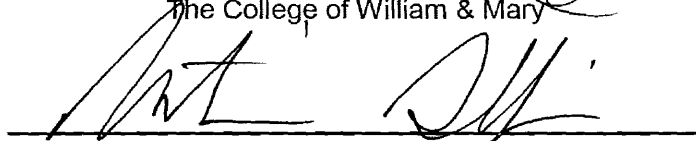
Approved by the Committee, April 2011



Committee Chair
Professor Michael Blakey PhD, Anthropology
The College of William & Mary



Professor Danielle Moretti-Langholtz PhD, Anthropology
The College of William & Mary



Professor Martin Gallivan PhD, Anthropology
The College of William & Mary

ABSTRACT PAGE

The following study involves the preliminary reconstruction of subsistence practices of three distinct archaeological burial populations from two sites by utilizing a bioarchaeological approach. The Hatch Site (44PG51) contained one of the burial populations, which included a mortuary program of primary single interment burial; whereas, the second site, the Edgehill Site (44CC29), contained two of the burial populations, both secondary ossuary burials, that are identified as burial features 4B3 (Ossuary 4) and 9K3 (Ossuary 5). Both sites are located within the inner region of the Coastal Plain of Virginia within 15 miles from one another and provide comparable data sets based on geographic location as well as temporal affiliation, which was determined to be the Late Woodland I period.

The analysis provided within this study first examines the sites individually, highlighting key features of the sites that pertain to the reconstruction of dietary patterning, such as burial chronology, burial patterning, and paleopathological results from the dental analyses. The paleopathological markers used for subsistence and nutrition analyses were based on the dentition and included dental caries and enamel hypoplasias. The overall patterns reflected by the data suggest these burial populations represent communities who utilized horticultural based practices to attain part of their dietary needs. This study presents a key piece of evidence necessary for the reconstruction of subsistence patterns during the Late Woodland I period in Virginia. Although archaeological evidence exists that identifies the exploitation of terrestrial and aquatic fauna, little evidence has been recovered regarding the use of domesticated plant species in this region, which play a role in the development of social and cultural practices.

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Chapter One

Introduction

The field of bioarchaeology refers to the study human remains within an archaeological context and is part of a “larger biocultural approach to the study of human societies past and present” (Gold 1999:71; Larsen 1997). Skeletal analyses were commonly regarded as time consuming and their potential overlooked by many archaeologists in previous decades; however, during the past two decades the information provided by burial populations has been subject to incorporation into more recent archaeological research (Larsen 1997; Gold 2000). Analyses conducted on skeletal materials are now utilized in archaeological studies as a means to unravel the social and cultural complexities during the prehistoric as well as the historic era. Thus, incorporation of these data allows for a more complete account of the archaeological record, requiring skills that archaeologists might not have had.

Bioarchaeological studies are utilized for identifying mortuary practices, paleodemography, physiological stressors, physical activities, social and cultural variations among and between populations, environmental adaptations, dietary and nutritional inferences, etc. (e.g., Blakey, et al. 1994; Blakey and Armelagos 1985; Curry 1999; Gold 2004; Hutchinson 2002; Larsen 1997; Larsen, et al. 2007). One region that has incorporated the aforementioned bioarchaeological research topics is the southeastern United States. Prior to European contact (pre-contact era) there are no written records, which places the responsibility of delineating past cultures to researchers who specialize in the material remains of the past. The southeastern United States underwent several

cultural transitional periods that included shifts in (not limited to) settlement patterning, population interaction, mortuary practices, and subsistence practices (Gallivan 2003; Gold 1999:12-14; Magoon 2010:12; see also Chapter 3). Based on the archaeological record, this region is referred to as the Eastern Woodlands, which includes the area known today as Virginia (Dent 1995). Although Virginia is considered to be part of the Eastern Woodlands culture area it only has three distinct defined archaeological periods because, based on the archaeological record, there is little archaeological data to link populations to Mississippian phenomena (Gold 1999:1).

Studies of archaeologically related human skeletal remains continue to provide data necessary for the reconstruction of aspects of past communities (ie. social organization, human-environment relationships, cultural practices, etc.). Through the use of a bioarchaeological approach, the following study provides an analysis of the burial contexts from two sites within the region of Virginia referred to as the Coastal Plain during the Late Woodland period (ca. AD 900-1600). Both sites, 44PG51 (Hatch Site) and 44CC29 (Edgehill Site), contain human skeletal material that allow for a comparable analysis based on temporal and geographical relationships. While the mortuary program present at site 44PG51 reflects primary-single interment burials, site 44PG29 burial contexts include only five secondary collective burials, referred to as ossuaries, with no presence of primary single interments. Dates provided through the processes of absolute and radiocarbon dating situate the Hatch Site as well as Ossuaries 4 and 5 from the Edgehill site within the confines of Inner Coastal Plain of Virginia during the Late Woodland I period (ca. AD 900-1300).

The analysis provided within this study examines the dentition of the human skeletal material from the aforementioned burial contexts as a means to address subsistence practices during the Late Woodland I period within the Inner Coastal Plain of Virginia. More specifically, the main research question utilized for the scope of this study is: Do these burial populations represent communities within the Inner Coastal Plain of Virginia who utilized horticultural practices as a way to fulfill part of their dietary regimen? In order to address this question, comparable methods to those employed by Debra Gold (2004) in her study of the burial mounds of Virginia focusing on dental analyses were utilized in this study. Additionally, multiple archaeological sites throughout located within the Coastal Plain region of Virginia are utilized for comparative purposes throughout this study. The following chapter defines these methods, and provides an outline for the approaches and contexts of the analyses and archaeological sites within this study, respectively. While providing an explanation of the methodologies utilized for the analyses presented in the following chapters, Chapter Two also identifies a subset of research goals as well as the comparability of the skeletal data.

Chapter Three discusses several cultural characteristics of the Native people of the Coastal Plain of Virginia during the Late Woodland period that have been identified through archaeological, archaeobotanical, and ethnohistorical research. These cultural patterns include material items (ie. lithics, pottery, etc.), subsistence practices (ie. extensive horticulture, harvesting of nuts, hunting, etc.), and burial practices, which provide a necessary contextual base for the following chapters.

In Chapters Four and Five the Hatch Site and Edgehill Site are examined, respectively. First, site descriptions are given, providing an overview of the site's location and general context information. Second, a chronological overview provides dates for the burial contexts of the sites based on ceramic absolute dating and radiocarbon dating. The following aspects of these chapters discuss the mortuary programs present at the sites and provide preliminary analyses of the data recorded based on the analyses of the dentition. The overall purpose of Chapters Four and Five is to explore preliminary analyses at the site level and any potential trends that may be present in the data.

Chapter Six examines the various methods for resource exploitation during the Late Woodland period as well as the chemical analyses utilized to test for different dietary regimens (ie. maize, native weedy plants, riverine fauna, etc.). The chapter then provides further analyses and comparisons at both the intra and inter site levels, exploring trends within and between the Hatch Site and Edgehill Site. Also, comparisons are made at the regional level, demonstrating some similarities.

In the concluding chapter the findings are summarized and the hypotheses that are presented in Chapter Two are addressed, which indicate that horticultural practices are present during the Late Woodland I period. The overall research and analyses utilized for and provided within this study have allowed for further insight necessary for a more complete reconstruction of the lives of Native people within the Coastal Plain region of Late Woodland Virginia. Additionally, future research is discussed briefly, identifying the need for continued bioarchaeological studies for the Hatch and Edgehill Sites (ie. variations in burial practices, further identification and analysis of paleopathological landmarks, possible chemical analyses for the Hatch Site material, etc.).

Chapter Two

Bioarchaeological Methods and Models

While interpretations have been made about subsistence practices in the Eastern Woodlands and when the rise of agriculture began, little evidence has been provided that sheds light on this subject matter within the Virginia Coastal Plain. Using a bioarchaeological analysis, evidence from the Hatch and Edgehill Sites provide the opportunity for research to be conducted on the subsistence practices of communities represented by the burial populations interred at these sites. This study involves an examination of the dentition from the burial populations of these sites in order to provide data on diet and nutrition during the Late Woodland I period within the Inner Coastal Plain of Virginia. In order to ascertain the overall nature of subsistence patterns during this time period with regards to the incorporation of horticultural practices, two paleopathological landmarks were examined (discussed below). Dental caries were analyzed in conjunction with methods established by Gold (2004) as a means to ascertain the use of domesticates within the dietary regimes of the burial populations. Although there are several types of enamel hypoplasias (enamel defects), the presence of horizontal grooves in the enamel, referred to as linear enamel hypoplasias, were recorded as a way to identify the presence of physiological stressors. According to Larsen (1997:44) enamel hypoplasias in archaeological populations are more commonly caused by systemic metabolic stress, rather than heredity or localized traumas.

The data collected from the skeletal material from the Hatch (44PG51) and Edgehill Sites (44CC29) provided a comparable set of data needed to establish inferences

pertaining to subsistence practices utilized by the burial populations. Although two dating methods were used for the burial contexts at these sites, the radiocarbon dates were adhered to as a reference point for the temporal associations. The multiple burials at the Hatch Site are affiliated with the Late Woodland I period; whereas, only two of the five ossuaries at the Edgehill Site are analyzed within this study (Ossuaries 4 and 5), which are also affiliated with the Late Woodland I period. The dates produced from the aforementioned burial contexts as well as the geographic proximity to one another demonstrate that the data collected from these burial populations are comparable. Additionally, both sites are situated within the boundaries of the Inner Coastal Plain of Virginia.

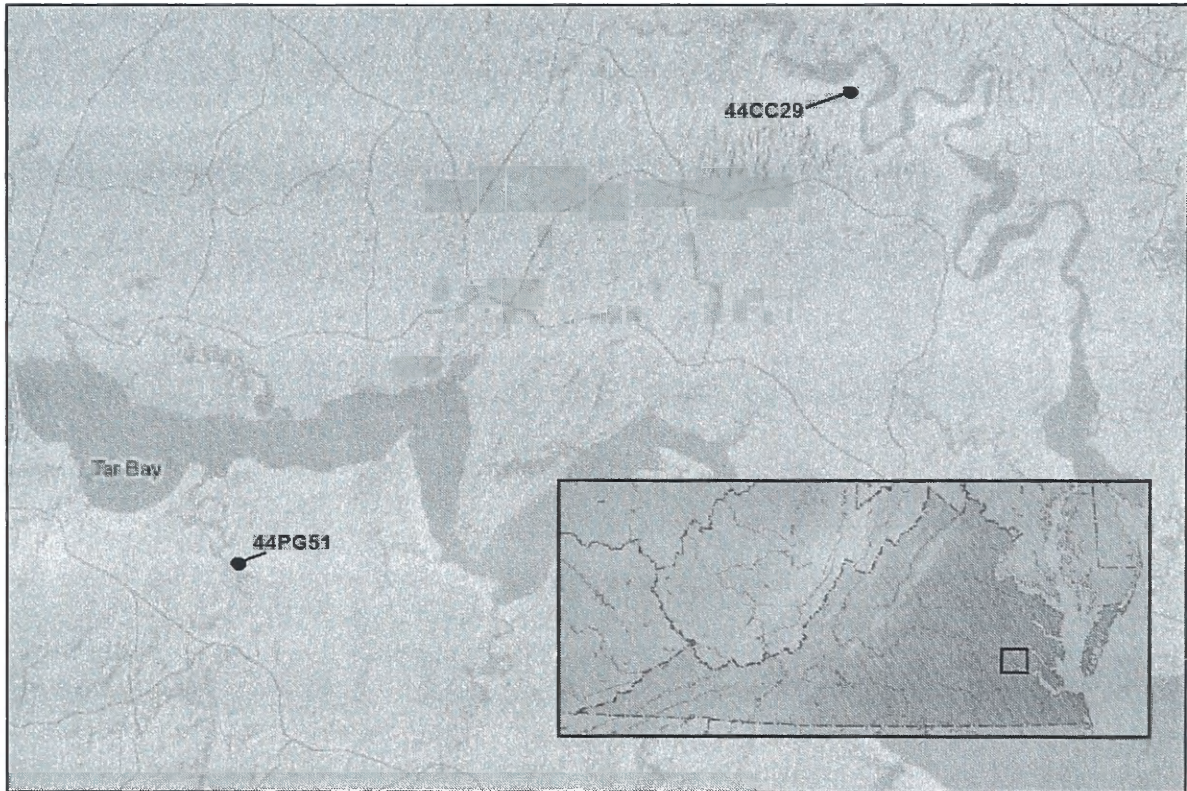
The primary research question and the subset of research questions for this study are focused on subsistence practices within the Coastal Plain of Virginia during the Late Woodland I period. The temporal and geographical criteria for the scope of the following study illustrate that the data used for this study adhere to that criteria (discussed below), which lend important insight to these questions. Are the data from the burial populations indicative of the incorporation and utilization of horticultural practices? While this primary research question can be applied to both sites, some of the secondary research questions can only be applied to the Hatch Site, which allows for a bioarchaeological analysis at the individual level due to the presence of primary-single interments. Do the data reflect any notable differences in dietary practices and nutritional health based on sex and age? Although, inferences at the level of the individual cannot be attained for Ossuaries 4 and 5 of the Edgehill Site due to the comingled nature of the skeletal materials, general trends can be analyzed. Are there any observable trends in the data

between the burial populations at both sites? More specifically, can any temporal trends in subsistence patterning be observed? The following methodology and models presented in this chapter provide an outline for the analyses of the dental paleopathological data and allow for an adequate reconstruction of subsistence practices based on the identified research questions.

Identification of Research

An examination of human skeletal materials from the following two sites, 44PG51 and 44CC29, will provide data on subsistence practices within the Late Woodland Coastal Plain of Virginia (Map 2.1). The first site to be discussed is the Hatch Site (44PG51). This site consisted of three components including 1) a large single interment cemetery; 2) numerous dog burials and; 3) archaeological material remains (e.g., pottery sherds, projectile points, shell middens) (Gregory 1980; Magoon 2010; also see chapter 4). The materials remains collected from the Hatch Site are currently being housed by Mr. Leverette Gregory, an avocational archaeologist. Other components are being housed in two separate locations. Skeletal remains from the dog burials are under the stewardship of Dr. Jeffrey Blick, PhD at the Georgia College and State University. In February of 2008, after several formal meetings with Leverette Gregory, the human skeletal materials from the Hatch Site were transferred from Mr. Gregory's facility to the care of Dane Magoon, and are currently being housed at Cultural Resources, Inc. in Glen Allen, VA. For the past couple of years, I have been working with Dane Magoon on several types of skeletal analysis, including, but not limited to, inventory and identification of dietary markers (the scope of this research). Once the inventory was completed for this collection, and age and sex estimates could be determined, the

dentition were examined for dietary and nutritional markers. Data from this analysis was presented at the 2010 Mid-Atlantic Archaeological Conference (Dore, et al. 2010).



Map 2.1: Location of the Hatch Site (44PG51) and the Edgehill Site (44CC29). 44PG51 is situated along Powell Creek on the south side of the James River; 44CC29 is situated along the western side of the Chickahominy River.

The Edgehill Site, which is part of the Chickahominy River Survey (CRS) (see Gallivan, et al. 2009), is the second site being utilized for this research. The human skeletal materials from the burial populations that are encompassed within the Chickahominy River Survey are currently housed at the Institute for Historical Biology at

the Department of Anthropology, under the direction of Dr. Michael Blakey, The College of William and Mary. Over the course of the past decade Dr. Martin Gallivan has established a professional rapport with the Chickahominy Tribe that has assisted in the continuing research on the human remains component of the CRS. Prior to the analysis of dentition used in this research, a meeting took place among Dr. Martin Gallivan, Assistant Chief Wayne Adkins of the Chickahominy Tribe, and me, during which I was able to explain the research goals of my thesis. With the agreement of the Chickahominy Tribal Council, the research commenced. The Edgehill Site was chosen because there were several burial components excavated within the site boundaries, including five ossuaries (Gallivan, et al. 2009). However, for the purposes of this research data from the two oldest ossuaries were utilized. I was responsible for the collection of the data from ossuaries four and five.

This study focuses on a dental analysis from all of the individuals of the burial populations from the Hatch Site (44PG51) as well as from ossuaries four and five from the Edgehill Site (44CC29). The dentition data for ossuaries one and two of the Edgehill Site were already collected at the time of this project and were utilized for temporal comparisons only.

Research Parameters and Analysis

Subsistence practices and nutritional health are the basis for numerous archaeological research projects to further discussions about the developments in resource exploitation (ie. fishing, horticultural/agricultural practices, hunting, etc.). Several such projects have examined the human skeletal remains from areas of pre-contact Virginia and have been utilized to address issues such as cultural boundaries,

socio-political complexes, potential nutritional differences based on sex and age, and provide a more accurate time at which horticulture was introduced in the region of the Eastern Woodlands, etc., (e.g. Gold 2000; Gold 2004). While archaeological, archaeobotanical, and other pre-contact studies have sought to answer questions pertaining to subsistence practices within the Coastal Plain region of Virginia, the level of recovered evidence associated with the development of horticultural/agricultural practices has shed little light on the subject matter. The research within this study seeks to reexamine concepts of subsistence practices and nutritional health through an analysis of the dentition from the Hatch (44PG51) and Edgehill Sites (44CC29).

As a result of this research involving two different sites with multiple burial populations, the analysis was conducted in several steps. Until the human skeletal remains from 44PG51 were brought to Cultural Resources, Inc., no bioarchaeological analysis had been conducted on the skeletal remains. However, an inventory was already completed for the burial populations from the Edgehill Site. Thus, the first objective was to create a complete inventory of the Hatch burial population, which involved the articulation of the skeletal remains for each individual. It is important to note that the burial populations from 44PG51 and 44CC29 represent two different burial practices. The burials from the Hatch Site are primary-single interment burials, meaning that individuals were interred individually and it is believed that this was the final step in the community's burial process (Magoon 2010:41). The burial processes represented by the remains at the Edgehill Site are referred to as ossuaries, which are secondary and collective burial practices. As the inventory process for 44PG51 was being conducted, analyses such as sex and age estimation were completed. In addition, during the

inventory process data pertaining to the dentition was recorded, including the identification of dietary and health related markers, for the scope of this study.

To facilitate the first portion of the analysis process, Buikstra and Ubelaker (1994), Baker, et al. (2005), White and Folkens (2005), and Van Beek (1996) were utilized as a means to standardize skeletal identification and data collection. The necessity for standardizing methods while estimating age and sex represented within a burial population is that it allows for the construction of a more accurate demographic profile. Several diagnostic skeletal landmarks were used during this process and were based on the two general categories of subadult (roughly 0yr-17yr) and adult (approx. 18yrs and above). As soon as more specific age categories were established, subcategories were identified (these subcategories pertain to this study).

Gold (1999:213) notes that, “assignment of age at death is best done with an intact and well-preserved skeleton, from which a variety of observations can be correlated.” The preservation of the skeletal materials and the primary single interment burial process at Hatch makes it possible for such methods to be employed. Techniques varied between aging adults and aging subadults, where adult age ranges cover a larger span of estimation. For adults, the techniques that were utilized included the closure of cranial sutures and the morphology of the auricular surface which is located on the innominate (Buikstra and Ubelaker, 1994). The age estimates based on the several suture points aligned fairly close to the estimates based on the auricular surfaces and were divided into young adult I (18-20 years), young adult II (21-34 years), middle adult (35-49 years), and old adult (50-65 years) (Dore, et al., 2010). Age estimations are more specific for subadults and were determined by analysis of dental development of the

permanent dentition (Buikstra and Ubelaker 1994:50-51; Gold 1999:214). A combination of the preservation of the skeletal remains of the subadult population and the type of interment assisted in making it possible for this estimation (see chapter 3). Age categories of five year intervals were established for the purposes of this study for the Hatch Site; subadult I (0-5 years), subadult II (6-10 years), and subadult III (11-17 years). The next stage in the analysis process involved sex determination of the Hatch Site burial population.

Several techniques were utilized for determining the sex of the adult individuals at 44PG51. Again, utilizing Buikstra and Ubelaker (1994), the methods employed were based on both cranial and post-cranial morphology including the sacral arch, the greater sciatic notch, the nuchal crest, the supra-orbital ridge, and the preauricular sulcus. The condition and completeness of the adults in this burial population made it possible to place them in one of three categories 1) male; 2) female; and 3) undetermined sex. For those individuals classified within the subadult category no sex was determined. Although some researchers have attempted to distinguish subadults as male or female, current methods do not permit an accurate determination. Differences between male and female characteristics prior to puberty do not exhibit sufficient variability for proper identification (Buikstra and Ubelaker 1994; Gold 1999). Therefore, the subadults within the Hatch burial population are categorized under undetermined sex. The final part of the data collection process for 44PG51 involved recording the occurrences of paleopathological landmarks relating to diet and health.

The same methods were used for collecting the data pertaining to the dentition of the Hatch Site and the Edgehill Site's ossuaries 4 and 5. During the process of inventory

for those teeth that were not articulated it was first necessary to identify the tooth type (ie. molar, premolar, canine, or incisor), the side the tooth was associated with, if the tooth was permanent (adult) or deciduous, and whether it was mandibular or maxillary (van Beek 1996). For those teeth that were articulated or were present with an associated alveolar section of bone the process was simplified. Based on the standards for inventorying the status of a tooth, Buikstra and Ubelaker (1994) classify the current status of a tooth into nine categories. In order for the tooth to be counted in the data set for this study it had to have a status of present (loose or articulated) or present with the full development of the crown. As part of this research project for both of the sites two dietary and nutritional landmarks were observed and recoded.

The first observed conditions are referred to as carious lesions (Figure 2.1), which are the result of dental caries and can provide useful data regarding the consumption of foodstuff in the archaeological record (Buikstra and Ubelaker 1994:54; Gold 2004:92; Hillson 2002:272). Dental caries refer to the process of the breakdown or demineralization of the enamel, the dentine, and the cementum of a tooth as a result of the acidic property of oral bacteria from dental plaque (Hillson 2002:269; Larsen 1997:65). Although there are several factors that play a role in the development of carious lesions, the variations of cariogenesis that are observed in human populations can be strongly influenced by the types of foods consumed and the manner in which they are prepared (Larsen 1997:72). Carious lesions are an important source of data when attempting to establish inferences about the subsistence practices utilized in particular geographic and temporal regions and periods respectively. Frequencies of caries lend insight about the communities represented by the burial populations because the

prevalence of these particular lesions increases in sedentary groups whose subsistence practices are more horticulturally/agriculturally based than among hunter-gatherers (Gold 2004:87; Larsen 1997:73). Categories established by Buikstra and Ubelaker (1994:55) were used to classify the type of carious lesion present, while classifications for the size and specific location of the lesion were used that were developed by the Institute for Historical Biology, College of William and Mary (Table 2.1; Table 2.2).



Figure 2.1: An example of a carious lesion located on the occlusal surface of a mandibular molar. This photo is of a mandible belonging to an individual from the Rutland Site (44HN0356) burial population. (Photo courtesy of Cultural Resources, Inc.).

Table 2.1
Caries Location on Dentition

Caries Location	Description
1	Labial
2	Lingual
3	Mesial
4	Distal
5	Occlusal
6	Buccal

Table 2.2
Size of Dental Caries

Caries Size	Description
1	Small Pit/Fissure
2	Medium to Large Lesion
3	Large Lesion
4	Tooth Crown Completely Destroyed

One issue that needed to be addressed was the inclusion of the aforementioned dentition that was identified as present (loose or articulated) when recording the presence of carious lesions. In accordance with the stages of development based on Buikstra and Ubelaker's (1994:51) assertions, if the permanent teeth were present with no associated alveolar bone the formation status needed to be development of at least half of the root to be considered potentially erupted from the crypt. Once all carious lesion data were collected, the lesion data were then compiled for each burial population to determine the frequency of lesions based on several categories, including frequencies based on tooth type, age (if applicable), sex (if applicable), and lesion location (see chapters 4 and 5). Larsen (2003:68) and Gold (2004:93) provide three categories for various subsistence practices as defined by Christi Turner, whose research indicated that there is a "steadily increasing gradient for groups practicing foraging to an agricultural way of life." The classification of these subsistence systems identifies foraging societies to have an average carious lesion frequency around 1.7%; a society practicing a mix of foraging and agricultural lifestyle at a carious lesion frequency around 4.4%; and an agricultural society will be represented by a carious lesion frequency around 8.6% (Larsen 2003:68). Within the Eastern Woodlands the increase in carious lesion frequency is attributed to the dietary introduction of maize.

The second type of pathology observed for this study was the presence of linear enamel hypoplasias, which is a defect in the enamel during amelogenesis. These enamel defects manifest as a result of physiological perturbation (ie. hereditary anomalies, localized traumas, and systemic metabolic stress) during the development of the tooth crown (Blakey, et al. 1994:372; Larsen 1997:44). Hypoplasias are macrodefects that

can be observed with the naked eye and serve as a quantitative indication of metabolic stress (Figure 2.2). These defects are in the form of deficiencies in the thickness of the enamel and can vary from small pits to deep linear grooves (Hillson 2002:165; Larsen 1997:44-45). As noted by Blakey, et al. (1994:371), “The normal growth and development of dental enamel progresses with age at a fairly regular rate.” Because the enamel does not remodel after a disruption in its development process, the result are defects which are in the form of grooves and often referred to as linear enamel hypoplasias (LEH). Bioarchaeologists, such as Gold (2004:101) and Larsen (1997:46), have indicated that there are multiple stressors that can result in formation of enamel hypoplasias; however, through research conducted by Blakey, et al. (1994) the weaning hypothesis as a means to explain the prevalence of hypoplasias was proven false. Although enamel hypoplasias cannot be utilized as a way to interpret pre-contact dietary practices, LEH frequencies can serve as a way to illustrate possible trends in general undernutrition and as a nonspecific indicator of childhood stressors (Gold 2004:101).



Figure 2.2: Photograph illustrating examples of enamel hypoplasias (Magoon, 2010). This individual is not from the sites in this study. Based on the characteristics of these linear grooves the hypoplasias would be scores as 2=Clearly Present.

The final step of the data collection process was recording the occurrences of enamel hypoplasias. Even though some of the permanent dentition was either still in the crypt (unerupted but visible) or loose, the complete development of the crown made is possible to record valid data. Simply put, as long as the tooth was present and the initial root development had begun, the data was used in this study. As way to provide data comparability, Buikstra and Ubelaker (1994) established a set of standardized data recording methods, including the identification of enamel hypoplasias in the form of horizontal grooves (linear enamel hypoplasias). Blakey, et al. (1994) identifies two types

of enamel hypoplasias similar to the standardized identification presented by Buikstra and Ubelaker (1994), which are recorded as slight and moderate-severe and scored numerically as 1 and 2, respectively. Also, in Blakey, et al. (1994:374), the two types of identified linear enamel hypoplasias are compared to Corruccini, et al.'s (1985) classification system. The first category of enamel hypoplasia is referred to as moderate-severe hypoplasias, which is identified by Blakey, et al. (1994:374) as being comparable to Corruccini, et al.'s (1985:701) category of major growth arrests (MGA); the second category is referred to as slight hypoplasias, which is comparable to Corruccini, et al.'s (1985:702) category of linear enamel hypoplasias (LEH).

These classifications and others similar to it differentiate the defects based on a relative idea of size, which means some researchers may view what should be classified as severe and what should be classified as slight differently. Thus, in order to establish a more standardized method for recording linear enamel hypoplasias while utilizing Buikstra and Ubelaker's methods for data comparability the categories of clearly present and barely discernable were used for this study, scored as 1 and 2 respectively. For the occurrences that might be seen as major growth arrests, or moderate-severe hypoplasias, these defects were scored under the classification of clearly present. The defects that might be scored as slight hypoplasias were classified as barely discernable, meaning a 10x lens had to be used to verify their presence.

The LEH frequencies were used in conjunction with the carious lesion frequencies to determine possible trends or correlations that might be observed in the data. The final dissemination of the analysis process is established in the chapters of this study that provide individual site analyses in (see Chapters 4 and 5). Though enamel

hypoplasias are unable to provide specific detail about the dietary status of the pre-contact communities represented by this study, when combined with the subsistence inferences based on carious lesions, enamel hypoplasias will be useful in identifying possible health related trends.

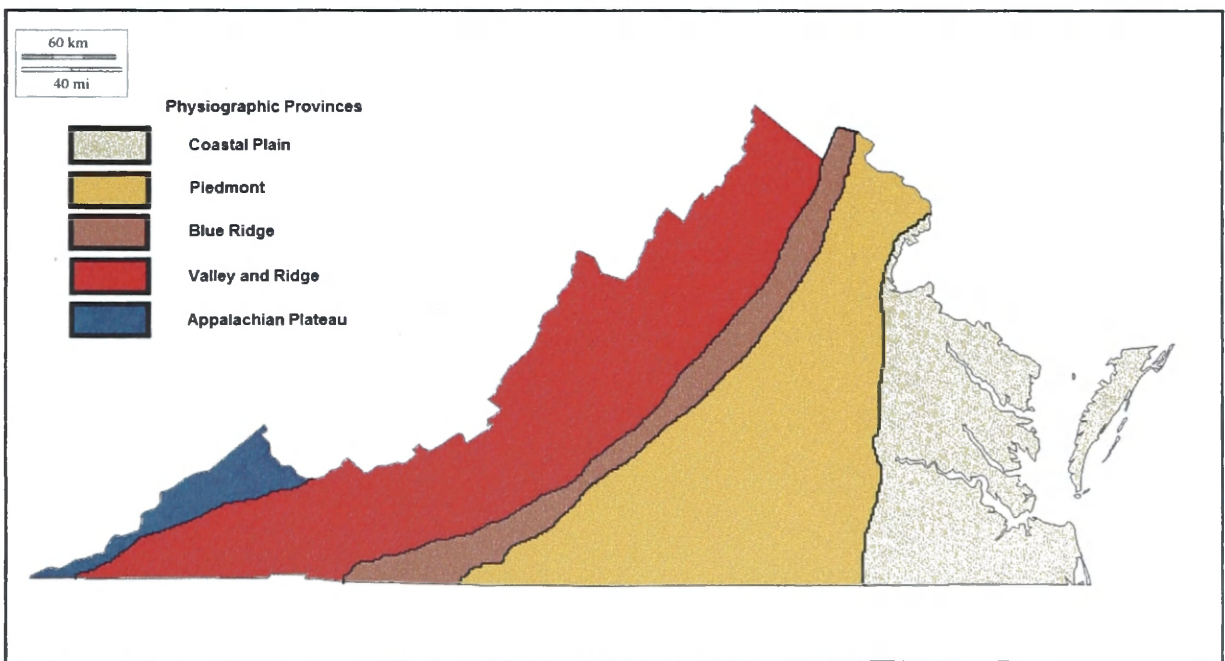
Research Models

Bioarchaeological research focuses on the human skeletal component of past populations, examining the hard tissues of bone and dentition in an attempt to understand past populations. The following bioarchaeological study utilizes a biocultural approach, establishing connections between what is being observed in the human skeletal material and indicators of diet as well as physiological stress, natural or social. When delving into the realm of pre-contact Virginia, it is important to understand that there are a couple of key factors that assist in providing a more accurate understanding of dietary and health issues. The first factor to be considered is the location of the sites within this study. Access to particular natural resources, animals and plants, plays a role in subsistence patterns. The second factor is the temporal period of the sites being studied, which helps to establish a timeline for the trends being observed as well as delineating village settlement patterns. Based on the time period of the Hatch and Edgehill Sites, the concept of middle range societies, as defined by Gallivan (2003) and Gold (2004), will be utilized as the model for the communities these two sites represent (discussed below).

Geographic Identification

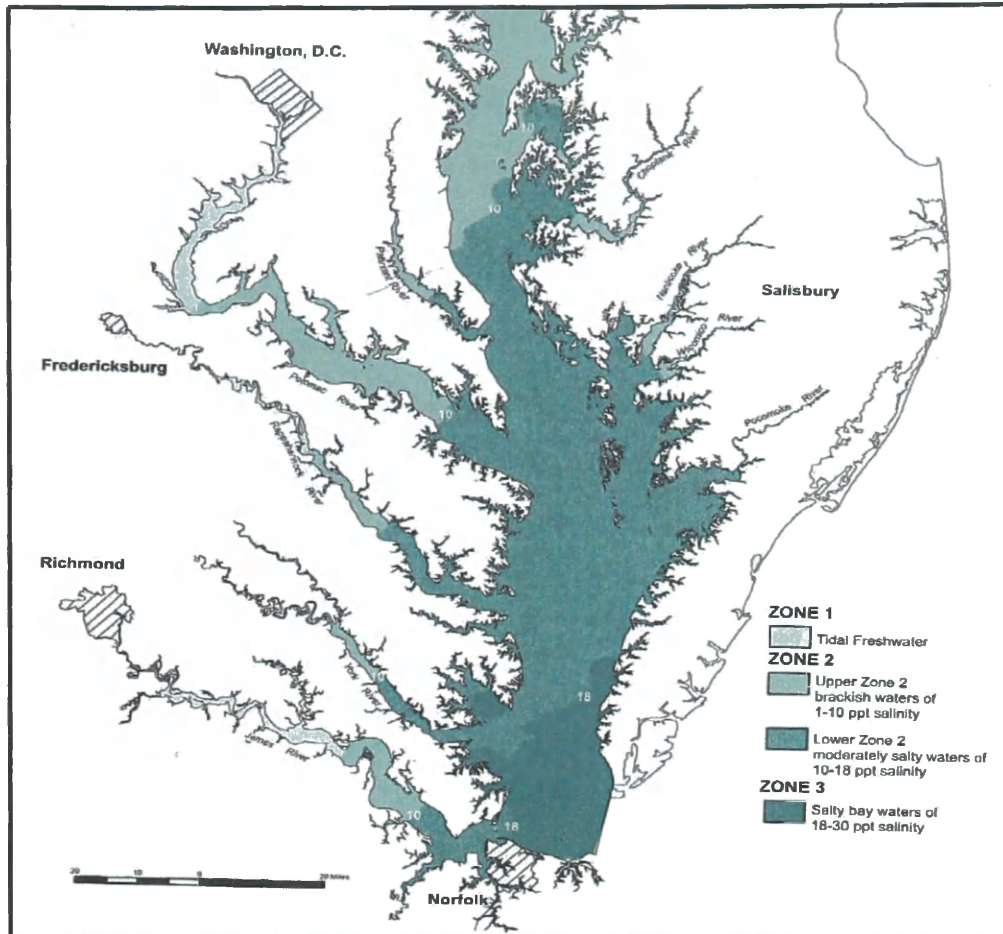
There are five physiographic provinces within what is now known as Virginia including (from west to east) the Appalachian Plateau, Valley and Ridge, Blue Ridge, Piedmont, and Coastal Plain (Map 2.2). Each of the physiographic regions presents a

variety in natural resources based on geological composition and water accessibility. One aspect linking these physiographic provinces to one another are major rivers including the Potomac, James, and Rappahannock Rivers, which also provide an important resource during the Late Woodland Period especially for settlements with access to these rivers and their tributaries (Gold 1999:198). The sites within this study are located along two different tributaries of the James River, the Chickahominy River and Powell's Creek in the physiographic province known as the Coastal Plain. The boundary separating the Coastal Plain and the Piedmont provinces is referred to as the fall line and is based on distinct changes in the geomorphic composition of the soils as well as subsoil bases (Dent 1995; see also chapter 3). Subsistence patterns during the Late Woodland period vary depending on the availability and accessibility of particular terrestrial and aquatic resources (ie. freshwater resources vs. salt water resources, seasonal resource availability, etc.).



Map 2.2: Illustration identifying the five physiographic provinces of Virginia.

One pattern of variability is addressed in Hutchinson, et al.'s (2007:52) research, examining the use of plant based resources and water based resources, such as shellfish, depending on the burial population's proximity to the fall line or the coast in the Coastal Plain of North Carolina. There are two broad ecological regions identified in this methodology, the first region is defined by its terrestrial and fresh water river basins; whereas, the second region is indentified by its marine saltwater to brackish estuary zones (Hutchinson 2002:17; Hutchinson et al., 2007:52; see also chapter 3). The same distinction can be utilized for the Coastal Plain of Virginia, defining inner and outer coastal plain based on the salinity levels from the Chesapeake Bay through the river drainages (Map 2.3). The two sites within this study are located within the boundaries of the Inner Coastal Plain during the Late Woodland Period.



Map 2.3: Illustration of varying salinity levels within the Chesapeake and Virginia river drainages (Lippson 2006:6).

Temporal Identification

Based on recent chemical analysis on materials from both research sites, it was determined that both sites were established within the Late Woodland Period (Magoon, 2009; Gallivan, 2011). Data for the timeline of the Hatch Site indicates that the burial population spans a date range of 200 years (Magoon, 2009; see also chapter 4). The Edgehill Site contains multiple burial populations whose dates span the Late Woodland Period (Gallivan, 2011; see also chapter 5). Late Woodland archaeology has been able to

identify trends in aspects of social life as well as cultural practices, ranging from settlement patterns to sociopolitical organizations to variations in the uses of natural resources (e.g. Gallivan 2002; Gallivan, et al. 2009; Hutchinson 2002; Magoon 2010; Smith 1989; Turner 1992). An aspect of Late Woodland archaeology that is taken into account throughout this study is settlement pattern organization and size.

One identifying characteristic of pre-contact Virginia that separates the Middle Woodland Period from the Late Woodland Period is the increasing sedentism of groups and the similar increase in village settlements as well as their size and overall complexity (Gallivan 2003; Potter 1993). Within the Late Woodland Period a similar distinction is used to separate the broad Late Woodland Period into two sub-periods, Late Woodland I and Late Woodland II (Magoon 2010). Gallivan's (2003:28; 2010:6) research coincides with Magoon's (2010) assertion that the Late Woodland sub-periods are defined by the shifts in the establishment of large and permanent village communities. This shift indicates that Late Woodland I is characterized by smaller, semi-sedentary villages with non distinct communal organization; Late Woodland II can be characterized by larger, more sedentary villages with identifiable changes in "domestic production, community organization, and regional exchange" (Gallivan 2010:16). Site 44CC29 falls within the Sub-period of Late Woodland I based on dates provided through chemical analysis. Site 44CC29 contains a total of five ossuaries; however, only two were used in this study. The earliest two ossuaries, Ossuaries 4 and 5, date to the Late Woodland I period. Due to the nature of Late Woodland I village settlement patterns the model for middle range societies as identified by Gold (2004) and Gallivan (2003) will be used as a model to

characterize the communities represented by burial populations of the two sites within this study.

Settlement Model

Before discussing the applicability of middle range societies to this study, it is necessary to indicate that the aim of this study is not to apply a model of subsistence patterns to any particular social structure. Similar to the idea presented by Gold (2004:64), the application of the model for middle range societies within this study is for the general classification of size. Archaeological research identifying settlement patterning and the relative characteristics of the aforementioned Late Woodland Period within Virginia coincide with those characteristics of a middle range society. These characteristics are defined by Gold as:

“small in scale, relatively sedentary, somewhat agglomerated village settlements, with flexible systems of inequality. The variation among these societies is great, dependent on (among other factors) local conditions of environment, resource availability, demography, individual leaders, and neighboring communities” (2004:65).

Given the shift in characteristics that differentiate social and cultural components during the Late Woodland Period, the patterns that can be observed within this study can assist in inferences highlighting changes in dietary practices resulting in a more accurate temporal estimation for the incorporation of maize domestication in this region.

Several characteristics of a middle range society are represented through the bioarchaeological analysis of this study. The use of this model provides a scalar component necessary for comparisons between communities represented by the burial populations. For example, Dent (1995:249) and Gallivan (2003:28) indicate that prior to A.D. 1300 village settlements appear to be semi-sedentary and seasonal, this would

indicate that there is a strong potential for relatively small burial populations per site during this period. While the ossuaries at site 44CC29 are relatively small in size, they represent a more confined span of time. The burials at 44PG51, though not ossuaries, represent the continued interment of individuals within a confined area during a larger period of time. Thus, it can be inferred that the represented communities, regardless of their relationship within the surrounding communities, maintained a relatively small population.

Summary

Although numerous archaeological investigations have been conducted pertaining to the subsistence patterns and dietary practices in the Coastal Plain region of Virginia, data are limited with regards to the early portion of the Late Woodland Period. Through a bioarchaeological analysis for this region, more in depth inferences can be made about the communities represented by the burial populations that were previously unknown. The sites in this study are the Hatch Site (44PG51) and the Edgehill Site (44CC29) and represent communities within the Late Woodland Coastal Plain of Virginia. Pathological markers for diet and nutrition are examined in an attempt to indicate possible subsistence practices and temporal trends in the frequencies of the markers examined. Middle-range societies are categorized by small scale village communities, and on patterns identified within the archaeological record, the communities represented by the sites within these studies represent such societies.

Based on predetermined developments of settlement models and archaeological assertions with regard to the shift from hunter-gatherer to agricultural and the distinctions characterizing the various woodland periods it is expected that temporal trends will be

seen in the data from the earlier burials. With the introduction of maize in the dietary practices of this region, as populations become more sedentary during the Late Woodland I period, there should be a statistically significant difference in the carious lesion frequency between the earliest and latest burial populations during this time. Gold (1999:103) mentions that within a middle-range community if there are differences in aspects of status they would be based on factors like age or sex. The Hatch Site burial population allow for an examination of dental dietary markers based on an account of sex and age. As a result, differences in both LEH and carious lesion frequency should be present. Finally, there has been much debate about when the introduction of maize with the Coastal Plain region took place. Based on the recorded data and noted trends in frequencies, it is hypothesized that the incorporation of more horticultural based practices including the introduction of maize began gradually around the start of the Late Woodland period. Also, the culmination of frequency data for linear enamel hypoplasias and carious lesions indicate the possibility of a decrease in childhood stressors and possible improvement in nutrition and health patterns.

Chapter Three

Virginia Coastal Plain: The Pre-Contact Landscape

The scope of the research within this study takes place within the region known as the Chesapeake during the pre-contact era. This region, or study area, is identified as the Chesapeake due to its proximity to the Chesapeake Bay, which is a rich estuary zone that was formed beginning approximately ca. 11,000-10,000 bp until approximately ca. 3,000 bp (Dent 1995; Gallivan 2010). It is through the use of the archaeological record that cultural practices and networks have been identified within this area, and as Gallivan (2010:5) mentions these networks and traditions can be identified within the Coastal Plain and Piedmont of Virginia at around 1200 B.C. The ability to define cultural boundaries archaeologically (ie. pottery, projectile points, archaeological features, etc.) has assisted in the determination of variations across space as well as temporal transitions in settlement patterns, burial practices, subsistence practices, and population growth (Gold 2004; Larsen 2001; Gallivan 2003).

The first aspect of the pre-contact era examined within this chapter is the identification of the physiographic provinces within Virginia, which has been utilized in research such as Gold's (2004) to distinguish some variation in dietary practices. In addition to the physiographic provinces are the temporal periods, which assist in distinguishing the processes and trends seen in the archaeological record. Included in the transitions that can be observed within this record are the burial and dietary practices that took place among pre-contact populations in what is now Virginia. The other aspects of this chapter will discuss the Late Woodland period as well as the subsistence patterns and

burial practices that have been identified through the use of archaeology to provide a contextual base for the research discussed in the following chapters.

Late Woodland Period Overview

Designated by dramatic shifts in climate, the Holocene Epoch (beginning ca. 11,000-10,000 bp) represents a period in human prehistory within the Chesapeake Region, where the natural environment allowed for population growth, cultural variation, and social development (Dent 1995; Magoon 2010). The latest of the Holocene periods within the Middle-Atlantic Region is referred to as the Woodland Period spanning approximately 3000 years from ca. 1,200 B.C. - A.D. 1600 (Table 3.1). Although the Native people of the Woodland Period demonstrate technological and behavioral adaptations within their environments, dependence on combinations of food resources and displays of nonsedentary settlements continued until ca. 900 A.D. (Dent 1995:221-222; Gallivan 2003:27-29; Magoon 2010:12-17). It is after the onset of the Late Woodland period (ca. A.D. 900-1600) when the archaeological record shows the emergence of more sedentary groups, incorporating horticultural practices within their subsistence needs. Through the establishment of sedentary village systems and localized development of resources, complex chiefdoms emerged within the Coastal Plain of Virginia (Rountree and Turner 2002:36).

Table 3.1
Virginia Woodland Chronology

Period	Dates
European Settlement	ca. A.D. 1570/1607-1700
Late Woodland	ca. A.D. 900-1600
-Late Woodland II	ca. A.D. 1300-1600
-Late Woodland I	ca. A.D. 900-1300
Middle Woodland	ca. 500 B.C.-A.D. 900
Early Woodland	ca. 1200-500 B.C.

The Late Woodland period is characterized by shifts in technology production, cultural practice, social development, and subsistence patterns. Both archaeological evidence during the early Late Woodland period and ethnohistorical accounts during European contact illustrate a variety of trends, and indicate the interaction of various factors that assisted in the shifts within these trends (e.g. Gallivan 2003; Hodges and Hodges 1994; Magoon 2010; Rountree 1993; Rountree and Turner 2002; Smith 1984). Pottery is another source of technology recovered from archaeological assemblages.

Middle Woodland (ca. A.D. 200-900) ceramics during the latter part of the period are characterized as lacking diversity. Shell-tempered Mockley ware, which includes cord marked and net-impressed types, was present during this time and continues into the Late Woodland period, along with the rise of Townsend ware around A.D. 900 (Magoon 2010; Turner 1997). By approximately A.D. 1300, ceramic types such as Gaston and Roanoke ware begin to develop, and by the close of the Late Woodland these types are present along the James River and are found on sites associated with the Powhatan Chiefdom.

Increased sedentism is reflected in the archaeological record for the Late Woodland period through the presence of middens, refuse pits, and house patterns on village sites throughout the Coastal Plain. Multiple sites provide evidence of numerous oval structures and structures of large size for domestic living as well as for food storage (Dent 1995:249). The marked increase in village size along with the more culturally structured village settlements coincides with the construction of palisaded villages (Figure 3.1) ca. A.D. 1300, such as the Accokeek site (Gallivan 2003; Dent 1995; Hodges and Hodges 1994). Another aspect that had developed during the Late Woodland period was the control of food stores. According to Magoon (2010:18), "Storage pit features shifted from external locations to house interiors, signaling increased household control of surplus production." Those sites where dwelling structure outlines exist represent varying levels of occupation and in the cases where there is an overlap of postholes this represents reoccupation, potentially from seasonal movements (Rountree and Turner 2002). Unlike the mode of production present in more hunter-gatherer social organizations, as groups establish a more sedentary lifestyle, modes for food storage and access change as do social and exchange networks (Gallivan 2003:49). Because of the

Late Woodland Chesapeake mortuary practices differ in several ways including (not limited to) treatment of the dead, burial goods, associated burial contexts (i.e. dog burials, size, and burial type from primary single interments to ossuaries, or secondary collective burials). The most common burial type within the coastal plain was the use of ossuaries; however, varying treatments of the dead occurred. For example, some burial practices involve the process of defleshing as is evidenced by marks on the bones, and then entailed the bundling of the remains as individuals (Boyd and Boyd 1992:261). The size of ossuaries varied, generally remaining fairly small in size, containing up to 20 individuals, and the proximity to the villages varied as well (Dent 1995:255; Curry 1999; Magoon 2010). Primary interments were utilized in addition to ossuaries at sites like Jordan's Point and Great Neck. Prior to this study it has been the assertion, due to the lack of evidence, that burial practices within the coastal plain south of the Potomac Creek Complex did not include ossuary interment during Late Woodland I; however, recent developments have been able to provide further insight into this matter.

Cultural Traditions

Late Woodland Virginia was occupied by three distinct linguistic groups known as Algonquian, Iroquoian, and Siouan speakers (Gallivan 2010:5; Hantman 1990:677; Turner 1992:97). The Algonquian speaking people of Virginia inhabited the region of the Coastal Plain ranging from the fall line at their western boundary through the eastern boundary of the Atlantic Ocean. The fall line separates the physiographic provinces of the Piedmont and the Coastal Plain. Although this boundary is caused by a geological difference, researchers assert that it also represents a cultural boundary based on archaeological evidence (Gallivan 2010:5; Rountree and Turner 2002:10). At the time of

European contact, the Powhatan communities were one of the Algonquian language groups within the coastal plain. Iroquoian groups were comprised of groups such as the Nottoway, Meherrin, and Tuscarora, who were in the southern portion of Virginia. According to Hantman (1990; see also Gallivan 2010; Hantman and Klein 1992; and Magoon 2010) the Siouan speakers of the Late Woodland resided within the interior of Virginia throughout the Piedmont region, and at the time of contact where one group was referred to as the Monacan. Several aspects of cultural life for these groups have been identified within the archaeological record and include pottery styles and mortuary practices.

Material culture from the archaeological record is often characterized temporally and regionally based on similarities found in form as well as composition. An example of this typology is described by Potter (1993:103) through an examination of the pottery that characterizes the Mockley phase during the Middle Woodland period (ca. A.D. 200-900). Mockley ware ceramics are present at sites throughout the Chesapeake region from Delaware to southern Virginia and are fairly homogenous throughout the Coastal Plain Region (Potter 1993:105; Turner 1992:103). There is some diversity within Mockley ware ceramics near the fall line in the Inner Coastal Plain, including cord marked and net-impressed. The introduction of the Townsend series took place at the onset of the Late Woodland following distribution patterns similar to that of Mockley ware; also, some archaeologists have viewed Townsend ware as an offshoot of Mockley ware ceramics (Dent 1995:244). Not only does Townsend ware represent a cultural shift in temporal periods, it also depicts cultural boundaries between the linguistic groups of Virginia. As noted by Magoon (2010:19; see also Gallivan 2003:128), “The distribution of four

ceramic types (Townsend, Potomac Creek, Roanoke, Cashie/Gaston) during the Late Woodland period in coastal Virginia displays a marked congruence with the documented distribution of language groups” (Figure 3.2). The presence of the Townsend series spans the seven centuries of the Late Woodland and is associated with the Algonquian groups within this region especially at the time of European contact.



Figure 3.2: Photo of a Late Woodland ceramic sherd recovered from the Hatch site (44PG51) burial context (Courtesy of Dane Magoon).

Townsend ware is a shell-tempered ceramic series that includes the Rappahannock fabric impressed and incised types, which represent the earliest Townsend types within the Late Woodland. Although there is a significant distribution of Townsend series ceramics during Late Woodland I, ceramic type distributions shift by the contact period (Dent 1995; Turner 1992). The most common type of Townsend ware present in Virginia is the Rappahannock Incised, which experienced a shift in motifs after A.D. 1300 with the incorporation of broad-line incised motifs (Dent 1995:245; Potter 1993:82). Covering much of coastal Virginia, the Rappahannock Complex (distinction given by Potter [1993]) referred to those geographic areas surrounding the Potomac and Rappahannock drainages where Townsend ware ceramics were utilized (Magoon 2010; Potter 1993). During Late Woodland II, trends in ceramic typology shift as Rappahannock typologies gave way to the establishment and distribution of Potomac Creek ware, which is a sand/crushed quartz-tempered ceramic that demonstrates the use of cord-impressed or plain types. In addition, by the time the Powhatan Chiefdom Complex had been established the ceramic wares of Roanoke and Cashie/Gaston had been distributed within the Coastal Plain of Virginia. Cashie/Gaston simple-stamped types have also been identified within one of the areas that comprised the Powhatan Chiefdom.

As demonstrated above, an understanding of the material culture from the archaeological record within the Coastal Plain region is vital when conducting studies on the cultural aspects of past peoples. This brief synopsis of ceramic development and variation assists in providing context identifying cultural boundaries based on site artifact assemblages. Within bioarchaeological studies it allows for temporal associations as well

as the identification of cultural relationships within and between burial populations. In addition to understanding the ceramic distributions within the archaeological record, is the general understanding of lithic taxonomy during the Late Woodland period.

Magoon (2010:18; see also Dent 1995:245-247) discusses a transition in the presence of triangular projectile points and their general decrease in size during the course of the Late Woodland period; possibly a result on the increased reliance with the use of bow technology (Figure 3.3). In addition, Rountree and Turner (2002:23-24) point out that due to the soil composition of the Coastal Plain stone is limited and usually consists of quartzite. Also, they note that “Most finer-grained stone, which allows minute pressure flaking to straighten and sharpen a point’s side, had to come by trade from the fall line and beyond (Rountree and Turner 2002:23). Variations in overall size and form assist in determining a rough chronology for assemblages based on lithic type. For example, although larger, more isosceles triangular projectile points begin in the Late Middle Woodland period and continue into the Late Woodland II period, overall characteristics such as the concavity of the base and the thinness of the point would allow for a possible classification of the Levanna type (ca. A.D. 700-1350). The shift from larger to smaller size more equilateral points begin to appear more frequently after ca. A.D. 1350. One type of projectile point that follows this trend is referred to as Madison points (ca. A.D. 1350-1700) (Magoon 2010:32). Material goods recovered from archaeological sites can be associated with several types of features, such as refuse pits, storage pits (both internal and external), burial assemblages (as with the Hatch Site), etc. (e.g. Gallivan et al. 2009; Gregory 1980; Magoon 2010; Klein n.d.; Potter 1993).



Figure 3.3: Stone projectile point recovered from the burial context at the Hatch site (44PG51) (Courtesy of Dane Magoon).

The mortuary programs exhibited within the Chesapeake region, both single primary interments and secondary ossuary burials can vary greatly in both size as well as ritual practice. While primary single interments are present within coastal Virginia, ossuaries have provided the bulk of the data collected thus far. Magoon (2010:26) indicates that at least 31 ossuaries, totaling approximately 900 individuals, have been excavated to date. Located within the southern portion of the Coastal Plain along the James and York River drainages, are the smaller of the Coastal Plain ossuaries. Within this region approximately 25 small ossuaries have been recovered and as previously mentioned contain between 10 and 20 individuals (Dent 1995:255). Also, the temporal

distinction, geographic location, and general proximity to villages and other burial contexts reflect or assist in inferring the nature of the burial population; whereas, smaller ossuaries may be a status indicator or simply representative of a family burial and those ossuaries of greater size could represent a community burial. The aforementioned relatively small size of Rappahannock Complex or more southern ossuaries vary greatly from the larger ossuaries to the north associated with the Potomac Creek Complex where ossuaries can contain more than 100 individuals per burial. The Claggett Farm Site (18PR40), located in Prince Charles County Maryland along the Potomac River, contained a recorded 281 individuals (Curry 1999:36). Another important consideration to make when identifying mortuary programs within this region is the burial association to a particular linguistic association.

During the Late Woodland period the Algonquian and Iroquoian-speaking peoples inhabited coastal Virginia. Although no ossuaries in the coastal region of Virginia have been associated with the Iroquoian groups to date, the cemetery at the Hand Site (44SN22), which contained approximately 131 individuals within its burial contexts, was affiliated with the Iroquoian people (Boyd and Boyd 1992; Magoon 2010). This cemetery consisted of a majority of single primary interments and contained a large amount of cremations and fire-treated burials dating to ca. A.D. 1580-1640. Material goods associated with this site include ceramics from the shell-tempered Chickahominy series as well as Roanoke simple-stamped, Smith (1984) and Hodges (1998; also Magoon 2010) have different assessments as to which ceramic type is dominant respectively. Among the burials excavated within coastal Virginia are the burial populations identified in this study from the Hatch Site and the Edgehill Site. The Hatch Site cemetery is the

only other primary-single interment burial context containing a large number of individuals within the Coastal Plain region of Virginia (chapter 4). As noted earlier in the chapter, it has been the assertion that ossuary burials are considered a Late Woodland II phenomenon based on dates provided through absolute dating, relative dating, and several radiocarbon dates. Examples provided in Magoon (2010:25; see also Boyd and Boyd 1992) list the earliest ossuary at ca. A.D. 1245 +/- 125. Recent dating of skeletal material from the burial contexts at the Edgehill Site (44CC29) place two of the ossuaries within the first half of the Late Woodland I period, predating the ossuary at the Governor's Land Site (Gallivan 2011; also chapter 5).

Examinations of burial contexts within coastal Virginia have illustrated diverse variations in the mortuary practices involved in interring the dead. At Great Neck the burial containing the "Great King of Great Neck" included a large variety of burial goods, including beads and copper ornaments; however, in some burial contexts the burial goods associated with the skeletal remains are unintentional associations (Boyd and Boyd 1992:262). Klein (n.d.) presents a brief ethnographic account within his examination of Virginia mortuary practices indicating that in a number of contexts, individuals were interred intentionally with artifacts, although the levels of significance varied. In addition, there are also examples of burial contexts associated with the presence of dog burials, such as those associated with the Hatch Site and the John Green Site (Boyd and Boyd 1992; Dent 1995; Magoon 2010; Turner 1992).

Subsistence Practices

Situated within the Chesapeake Region, the Coastal Plain of Virginia has undergone several terrestrial and marine shifts throughout the course of the Holocene

Epoch into what is evidenced in the Late Woodland period. The natural landscape of this environment was diverse in faunal, aquatic, and floral resources especially from the local estuaries and rivers (Dent 1995; Barfield and Barber 1992; Gremillion 2003). During the development of more socially and culturally interconnected landscapes the variation in local natural resources could account for the variations witnessed in the archaeological record. Considerations in seasonal variability of resources within this temperate biome must be realized as well when attempting to delineate any notable patterns in human-ecosystem interactions. Scarry (2003:51; also Fritz 2000) notes that, “Those who exploit wild resources do not simply let nature take its course, but rather take steps that enhance the yield and reliability on the plants on which they depend.” With increased sedentism occurring throughout the Late Woodland period, natural resources played a role in social and cultural aspects of life including food production and management, community development, population increase, and exchange networks (Barfield and Barber 1992; Dent 1995; Gallivan 2003; Gallivan 2007; Magoon 2010; Rountree and Turner 2002).

There are two lines of evidence that are utilized in order to extrapolate the types of exploitation of the natural environment occurring in the Coastal Plain. Faunal and floral materials recovered from Late Woodland archaeological contexts and ethnohistorical accounts comprise the data utilized to reconstruct prehistoric and historic subsistence practices. Barfield and Barber (1992:226) suggest “the coastal plain is the only region in Virginia where there exists a broad body of ethnohistorical data which can be combined with the archaeological record in order to attempt the reconstruction of general patterns...” One important matter regarding classifications of subsistence patterns is the interchangeable use of the terminology horticultural versus agricultural

within interpretive frameworks. Subsistence practices identified through the analyses of archaeological assemblages and early ethnohistorical data (e.g. Gallivan and Mcknight 2008; Potter 1993; Rountree 1993; Smith 1984) represent practices of extensive horticulture (Barfield and Barber 1992:233).

Within the Inner and Outer Coastal Plain several abundant resources are exploited at archaeological sites. In congruence with the non-aquatic faunal remains recovered from the Maycock's Point Site (44PG40), the remains of white-tailed deer comprise the majority of the faunal resource, along with raccoon and grey squirrel from the Paspahugh Site (44JC308) (Hodges and Hodges 1994). The faunal remains of turtles were also recovered, which are a type of resource found on several other sites as well from the Late Woodland period (see Dent 1995; Gallivan et al. 2009; Smith 1984). In addition, aquatic resources were exploited at this site including the presence of long-nosed gar, which represented a total of 92% of the identifiable remains, catfish and perch. Fish remains from 44PG40 also consisted of gar and catfish, however, the fish remains recovered varied more (Hodges and Hodges 1994:292-294). Varieties of both terrestrial and aquatic faunal resources have been recovered from archaeological sites throughout the Coastal Plain region demonstrating both seasonal patterns as well as localized patterns of exploitation (Barfield and Barber 1992; Dent 1995; Hodges and Hodges 1994; Turner 1992).

Seasonal practices and occupations have also been identified though the presence of material recovered such as oyster shell from the White Oak Point Site (44WM119), which was a large component of resources identified (Barfield and Barber 1992). Analyses of the collections from this site indicate that shifts can be seen in occupational

rounds during the winter and spring months. Exploiting aquatic foodstuffs not only depends on the time of year certain fishing practices are taking place it also varies given the location where the practices are being utilized and the salinity levels in the river drainages and confluences. Example of this are illustrated in Potter (1993) and Barfield and Barber (1992) at sites where middens are present that contain items like fresh water mussels, varying species of catfish, oysters, etc. (also Dent 1995; Hodges and Hodges 1994; Magoon 2010; Smith 1984). Ethnohistorical accounts indicate seasonal shifts in both practice and occupation, pointing out the presents of spring and summer fisheries as well as shifts from terrestrial fauna focuses in the spring months to floral focuses and mixed subsistence practices during the summer and fall months (Barber and Barfield 1992:227; Smith 1987:162).

A culmination of archaeobotanical and ethnohistorical data indicates the exploitation of floral resources within the confines of the Powhatan Chiefdom at the time of European contact (Dent 1995; Gallivan 2010; Rountree and Turner 2002; Turner 1992). Colonial accounts indicate that although a wide variety of plants were utilized in order to meet dietary needs (ie. maize, beans, squash, pumpkins, acorns, walnuts, etc.) maize was noticeably the most depended upon floral resource (Barfield and Barber 1992:234; also Rountree 1990; Smith 1987). Plant life both wild and domesticated were exploited on a seasonal basis ranging from servings of herbs and berries in the spring to harvested corn in the fall and assorted nut and other food stores utilized through the winter. Archaeological evidence suggests that such practices based on colonial accounts were similar throughout the Late Woodland period, although variations in settlement patterning and community organization existed between ca. A.D.1300-1600 (Potter 1982;

Turner 1992; Turner 1993). Turner (1992:106) notes that “Interpretations of these accounts indicate that agricultural products, such as maize, beans, and squash, met a substantial portion of all subsistence need, with estimates ranging from slightly under 50% to well over 75%.” However, the limited number of cultigens and floral remains recovered from archaeological sites make it difficult to establish well defined interpretations of subsistence practices during the span of the Late Woodland. Though it has been determined that a shift from hunter-gatherer to extensive horticultural practices did occur prior to European contact.

Within the Coastal Plain of Virginia archaeological evidence has been recovered from contexts associated with food consumption, such as storage pits and refuse pits. These flora remains have been utilized in attempts to ascertain subsistence patterns and subsequent shifts as well as dates for the introduction and incorporation of cultigens like maize and beans into the Coastal Plain region and subsistence practices, respectively (e.g. Gallivan and McKnight 2008; Hodges and Hodges 1994; Potter 1993). Although it is clear that cultigens (ie. maize) were present in the Late Woodland Coastal Plain, limited numbers of material recovered make it difficult to ascertain a more adequate analysis of subsistence practices. At the Paspahugh Site (44JC308) maize kernel and cupules were present, but only present in 45% of the identified samples, while hickory nutshell occurred in 95%, and acorn shell in 65% (Hodges and Hodges, 1994:289). On sites with earlier Late Woodland components, such as the Great Neck Site (44VB7) (located in the Outer Coastal Plain), maize was identified in 54% of the Late Woodland samples, in addition to the 17% identified in Middle Woodland samples (Turner 1992:107). Due to the limited presence of flora material recovered from archaeological contexts it becomes

necessary to pursue evidence at the micro-level. These types of analyses (e.g. Gallivan and McKnight 2008; see also Turner 1992) can provide a more localized perspective of the possible subsistence practices of the Late Woodland period. Gallivan and McKnight (2008) have been conducting research which examines and utilizes radiocarbon dates as a means to analyze archaeobotanical data from Virginia sites, including the Virginia Coastal Plain. Data like this can benefit archaeological and bioarchaeological studies by allowing for a more interpretive framework of subsistence practices and processes.

Additionally, although a number of human skeletal remains have been recovered from Late Woodland burial contexts, few have been published on or analyzed. Most of the analyses that have been conducted focus mainly on the descriptive characteristics such as calculations for the minimum number of individuals (MNI), sex and age determinations, and the identification of paleopathological lesions. Magoon (2010:24) notes that "...previous analyses for the coastal skeletal collections rarely exceed the length and specificity of the traditional, site-specific archaeological appendix" (e.g. Smith 1984; Ubelaker 1990). The lack of comparative analyses at the bioarchaeological level within the Coastal Plain region of Virginia has resulted in a more limited understanding of the burial populations than would have existed otherwise. Through the use of bioarchaeological analysis studies conducted elsewhere in Virginia, comparative studies have assisted in the reconstruction of prehistoric social and cultural practices and patterns. For example, the investigations conducted by Gold (1999; 2004), have allowed for a more accurate and complete examination of health and subsistence practices within the Late Woodland Piedmont. Others like Trimble (1996) have utilized the benefits of stable isotope analysis to identify geographic and diachronic differences in dietary shifts.

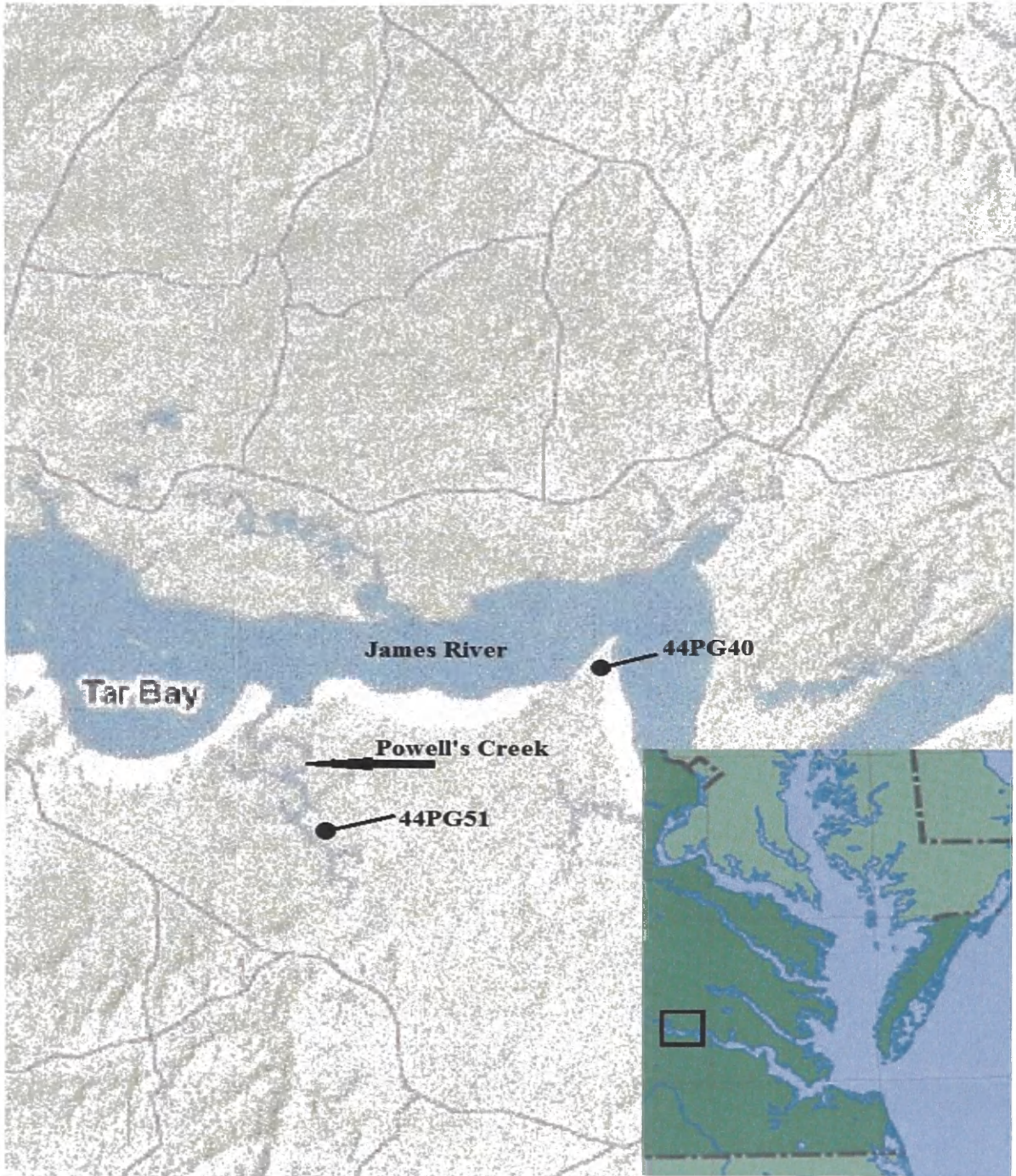
The incorporation of comparative analyses of Late Woodland burial populations will assist and allow for a more complete determination of subsistence practices and patterns to be identified and elaborated upon within the Coastal Plain region of Virginia (e.g. Hodges and Hodges 1994:295; also chapter 6).

Chapter Four

The Hatch Site (44PG51): Results and Preliminary Analysis

Site Environment

Located in Prince George County, Virginia, the Hatch Site (44PG51) is situated along the eastern shore of Powell's Creek. The confluence of Powell's Creek and the James River is positioned on the south side of the James River approximately 3.5 miles to the west of the archaeological resources known as Maycock's Point (44PG40) (Map 4.1). Approximately 2.0 miles south of the confluence, Site 44PG51 is situated on a relatively low flood terrace surrounded by swampy lowland areas north and south of the site, along with slightly elevated land to the east. Additionally, 44PG51 is located within the Inner Coastal Plain, which is the interior portion of the Coastal Plain region of Virginia nearest the geocultural boundary referred to as the fall line. Three temporal components of this site exist and can be categorized as Archaic, Woodland, and Colonial (Figure 4.1). The Archaic component of this site appears to extend further inland than the identified Woodland component (Gregory 1980); and due to the absence of resources present during this study little is known about this component. The Woodland component was measured at approximately 300 feet in width and 1600 feet in length, with elevations ranging from 5.0 to 12.0 feet above mean sea level (AMSL). Although prehistoric artifacts have been identified throughout the site, material and features from the Colonial component have been recovered and identified, and are concentrated more heavily in the northern and southern ends of the site (Magoon 2010:12). The aforementioned landform to the east of the site rises from about 50.0-60.0 feet AMSL and



Map 4.1: Location of Hatch Site (44PG51) in relation to Maycock's Point (44PG40).

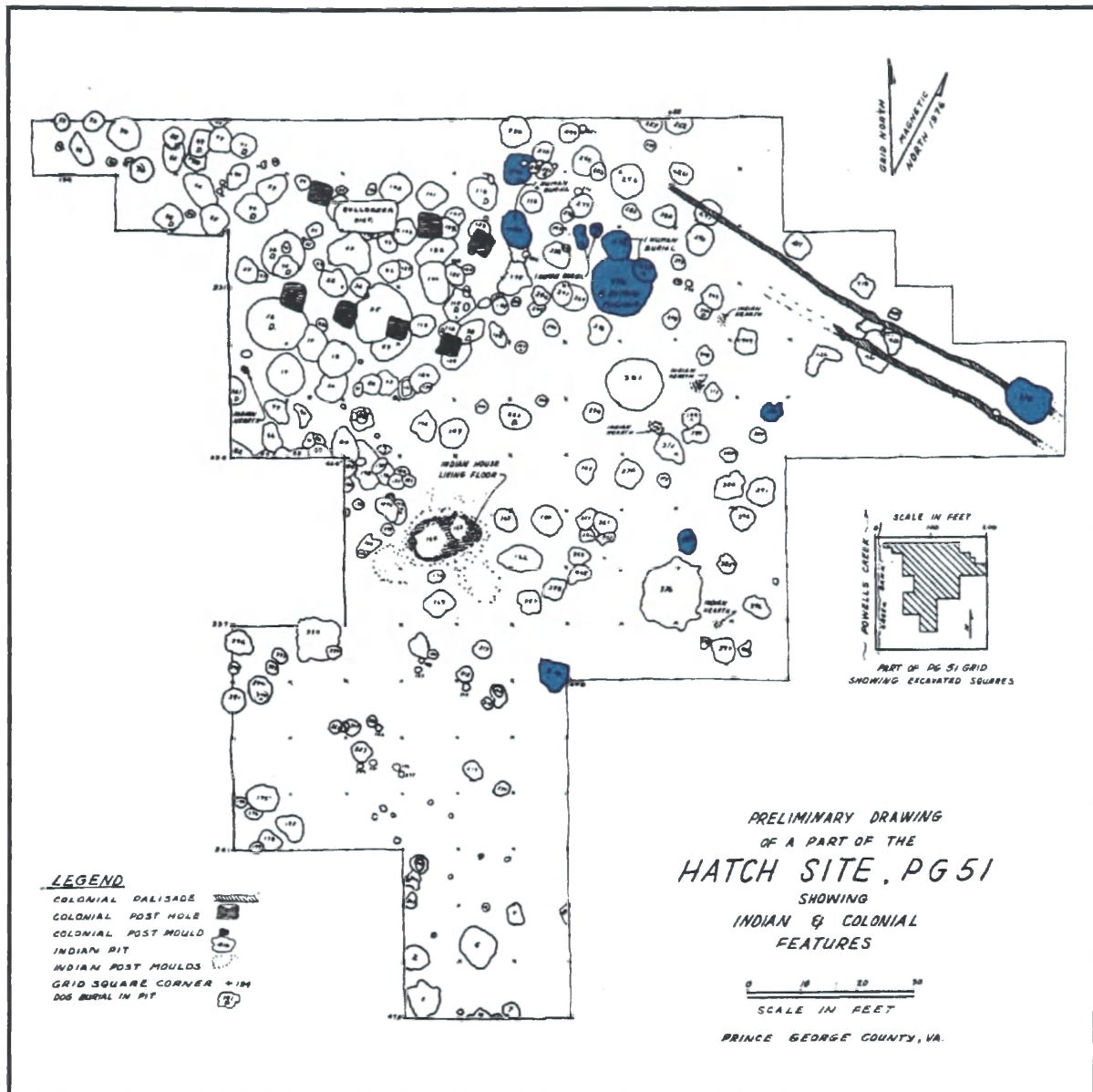


Figure 4.1: Detailed map of the central portion of the Hatch Site (44PG51) show archaeological and burial features (burials HB1 through HB16 marked in blue).

is approximately 3,000 to 4,000 feet inland from the creek's shore (Gregory 1980:239). It is also important to note, as identified by Magoon (2010:12), that site 44PG51 occupies the sub-province often referred to as the Coastal Lowland, which is an area of low relief that borders the major rivers within coastal Virginia as well as the Chesapeake Bay.

The areas adjacent the James River consist of fluvial sediments that date as far back as the Pleistocene Epoch (ca. 30,000-9,000 B.P), which were deposited by the James River during times of higher sea level and underlie the near surface soil composition (Magoon 2010:13; also Roberts and Bailey 2003). 44PG51 occupies an area identified as a low fluvial terrace, which is comprised of a soil classified as Catpoint fine sand/Class IIIs. Catpoint Class IIIs soils are defined as soils that include somewhat excessive drainage, which limits soil fertility; a seasonal high water table, which would likely seasonally limit occupation; and stony subsoils (Magoon 2010; Jones, et al. 1985). Surrounding Site 44PG51 are the Peawick-Emporia-Wickham soil associations. Soil compositions identified at the site are recorded as well-drained, sandy, and extend to approximately 4.0 feet in depth below modern grade, followed by a sandy clay layer (with iron oxide staining), then a yellow-red or red clay layer, and finally a layer of sandy clay and gravel. Lastly, the water table is observed at an approximate depth of 5.0-6.0 feet below modern grade (Gregory 1980:239-240; Magoon 2010). Also, noted within the burial contexts was a sizeable concentration of freshwater mussel shells, which not only led to the identification of the archaeological site, but assisted in the overall preservation of the human skeletal remains as well through an increase in calcium levels in the soil, offsetting the pH levels (see Gregory 1980; Magoon 2010).

General Chronology

Upon reviewing Gregory (1980), it is apparent that the presence of several groups of diagnostic artifacts reflects human occupation at the Hatch Site as early as the Archaic period (ie. Kirk and Palmer projectile points) through until the Colonial period. The Late Woodland component of the site was identified primarily through the preliminary analysis of the material remains, such as the triangular projectile points as well as the prehistoric ceramics that were recovered from the site. As noted in Magoon (2010:31), the materials utilized for the preliminary chronological estimations described in this study include only those associated with the human skeletal remains. Thus, the established chronology based on the associated artifacts is not based on the recovered artifacts from 44PG51 in its entirety, but only a sample. After the associated artifacts were examined a temporal identification of Late Woodland I was determined.

Associated artifacts included projectile points, ceramics, shell beads, and pipes; however, only the absolute dating based on projectile points and ceramic sherds will be introduced here. Projectile points were identified with an association to burials HB 7 and HB 23, thereby providing preliminary information on the probable date ranges for these burials (Magoon 2010:31). A total of seven points were recovered from both burials averaging 1.45 +/- 0.35 inches long, which falls within the Late Woodland I period based on an examination of Ritchie's (1971) assertions. Magoon (2010:32-33) indicates that the points recovered from HB 7 and HB 23 also parallel with Coe's (1964) classification of Roanoke points, which range from 20 to 60 millimeters in length (averaging 43 millimeters) and are "...well-made, triangular specimens with slightly concave bases and

sides.” The measurements for the points resemble the Roanoke classification type, thus indicating a probable Late Woodland date (Table 4.1).

Table 4.1
Attributes of Triangular Projectile Points

Site	Burial	Artifact	Length in inches (mm)	Width in inches (mm)	Thickness in inches (mm)	Base	L-W Ratio (mm)
44PG51	HBA7	CSPP A	1.2 (20.48)	0.88 (22.25)	0.266 (6.76)	Concave	1.37
44PG51	HB23	CSPP A	2.2 (55.88)	1.05 (26.67)	NA	Concave	2.1
44PG51	HB23	CSPP B	1.325 (33.66)	0.95 (24.13)	NA	Concave	1.39
44PG51	HB23	CSPP C	1.5 (38.10)	0.9 (22.86)	NA	Convex	1.67
44PG51	HB23	CSPP D	1.35 (34.29)	0.85 (21.59)	NA	Straight	1.59
44PG51	HB23	CSPP E	1.35 (34.29)	1 (25.40)	NA	Concave	1.35
44PG51	HB23	CSPP F	1.2 (30.48)	1.1 (27.97)	NA	Concave	1.09
Mean			1.45 (36.74)	0.96 (24.41)			
SD			0.35 (8.83)	0.093 (2.37)			
Median			1.35 (34.29)	0.95 (24.13)			

Based on assertions made by Magoon (2010:34), ceramics recovered from and associated with several burials suggest a Late Woodland time period for the burial contexts (Table 4.2). Both Middle and Woodland type pottery were identified, including Townsend, which was most common in the burial context, and one Mockley type sherd. Identifications reflect a manufacturing range from ca. A.D 800-1300, indicating a preliminary Late Woodland I time frame; however, when applying regression based calculations as well as the Calib 5.0 program, later dates were shown. Using the regression-based date of 614 +/- B.P., a one-sigma date range of ca. A.D. 1178-1489 is calculated. When the Calib 5.0 program is used a Late Woodland I date is suggested, but the two-sigma calibrated range of ca. A.D 1013-1669 include most of the Late Woodland period as well as the Contact Era. Although no Late Woodland II pottery types were identified with these burials, it is important to remember that these calculations come from a small sample size indicating a tentative dating sequence.

Within the confines of the Hatch Site's boundaries 112 dog burials were identified and the canine remains were recovered from the site. Of the 112 dog burial several were associated with human burials, which were then utilized in the dating process as a means to provide dates for the canine remains as well as the human skeletal remains. To be clear, AMS radiocarbon dates were obtained from the canine skeletal remains, no destructive testing methods have been used on the human skeletal materials. Remains from DB 23 (Dog Burial 23) were comingled with HB A2, the human burial feature; there appears to be an intentional association between HB A2 and DB 23. The remaining canine remains are currently being housed at the Georgia College and State University. The first of the radiocarbon dates was obtained from several canine bones associated with

DB 23 through the use of BETA Analytical's services, which provided a curve date projected at A.D. 1040. Additionally, Blick (2009; also Dore, et al. 2010; Magoon 2010) provided radiocarbon dates for three of the dog burials in his care that were associated with human burial features, which produced dates ranging within the Late Woodland I period (Table 4.3).

Table 4.2
Ceramic Types by Provenience

Feature	Sherd (N)	Temper	Surface	Type	Date Range
HB 5	Body (1)	Shell	Cordmarked	Sullivan/Mockley	AD 200-1600
HB 16	Body (3)	Shell	Fabric	Townsend	AD 900-1600
HB 3, 4, 5	Body (1)	Quartz	Fabric	Albemarle	AD 600-1300
HB 3, 4, 5	Body (1)	Quartz	Roughened	Albemarle	AD 600-1300
HB 3, 4, 5	Body (1)	Shell	Fabric	Townsend	AD 900-1600
HB 3, 4, 5	Spall (1)	Quartz Sand	NA	NA	NA
HB A9	Rim (1)	Shell	Fabric	Townsend	AD 900-1600
HB A9	Body (3)	Shell	Fabric	Townsend	AD 900-1600
HB 13	Body (1)	Shell	Fabric	Townsend	AD 900-1600
HB 13	Body (2)	Shell	Fabric	Townsend	AD 900-1600
HB 13	Body (2)	Shell	Roughened	Townsend	AD 900-1600
HB 13	Body (1)	Shell	Smoothed-over Roughened	Townsend	AD 900-1600
HB 13	Body (1)	Shell	Plain	NA	NA
HB 13	Body (1)	Shell	Eroded	NA	NA
HB 13	Body (1)	Shell	Cordmarked	NA	NA
HB 1	Body (1)	Shell	Knotted Net	Mockley	AD 200-900
HB 1	Pipe Stem (1)	Very fine sand	Eroded	NA	NA
HB 1	Body (1)	Shell	Plain	NA	NA
HB 1	Body (1)	Spall	Eroded	NA	NA

Table 4.3
Hatch Site Burials: Radiocarbon Dates Obtained from Dog Burials

Dog Burial	Associated Human Burial	Radiocarbon Age	Calibrate Age (Two-Sigma)	Temporal Association
DB A23	HB A2	A.D. 1040*	Cal. A.D. 1010-1070	Late Woodland I
DB A23**	HB A2	A.D. 1137 +/- 37yrs	Cal. A.D. 1163-1273	Late Woodland I
DB 37**	HB 17	A.D. 1046 +/- 29yrs	Cal. A.D. 1015-1155	Late Woodland I
DB 43**	HB 20	A.D. 905 +/- 56yrs	Cal. A.D. 1021-1226	Late Woodland I

* Date based on intercept of radiocarbon age with calibration curve

** Dates provided by Jeffrey Blick

Burial Context

During the archaeological excavations at site 44PG51 three separate burial clusters were identified resulting in a total of thirty-four context numbers (Figure 4.2). The first of these clusters encompasses the individuals from burial context HB 1 through HB23, which included the pit complex affiliated with burials HB 5 through HB 12 (Feature 275). Also, this burial section measures out at approximately 190 x 100 feet and was distributed though the central portion of the site. Burials HB A1 through HB A10 comprise the second group of interments and are situated south of the central portion of

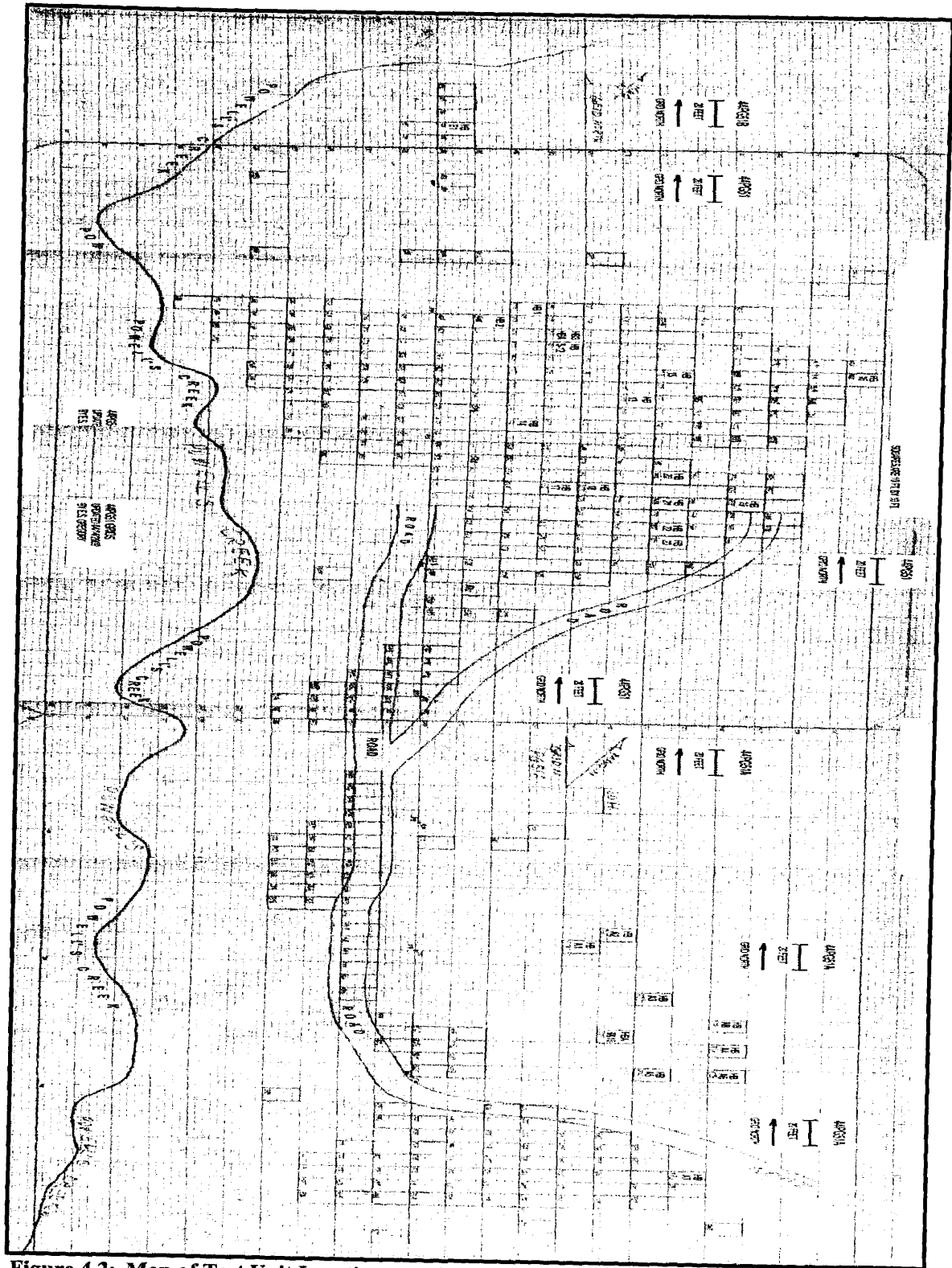


Figure 4.2: Map of Test Unit Locations at 44PG51, Detailing General Locations of Human Burial Features.

the site by approximately 300 feet. Excavation patterns from the plan view map of the site show an area between these two sections of burials, meaning that a probability for the presence of additional burials exists. A single burial, HB B1, was identified roughly 140 feet to the north of the first grouping of burials HB 1 through HB 23. Based on the information provided by Magoon (2010:41), the measurements for the area containing all are approximately 120 x 830 feet.

Primary burial features within the confines of site 44PG51 appear to be the trend for mortuary patterning, indicating that the foci of burial practices were on the permanent place of single individuals at or around the time of death. Although there are 34 identified burial features at the Hatch Site, the total number of identifiable human skeletal remains represents 36 individuals. Additionally, no secondary burial interments that would constitute an ossuary burial program or bundled remains were represented by the burial patterning. Of the interred individuals, 27 (75%) represent single primary interment, 3 (8.33%) are indicative of possible cremation practices based on burnt skeletal material, and one (2.78%) represents a possible secondary burial. The remaining six individuals were classified as indeterminate with regards to burial patterning due to either poor preservation or post-depositional disturbances. Both adults and subadults are represented in the Hatch Site burial population, and their distribution is indicated below. Typically, the trend for burial positioning entails most of the adults and older portion of the subadults interred on their sides, while the younger subadults were positioned on their backs.

Throughout the site several burial features were identified that contained the skeletal remains of multiple individuals, which included the presence of subadult skeletal

remains. For example, burial HB A9 and HB A10 represent one combination of multiple individuals, where HB A9 contained an older subadult and HB A10 contained an adult. The aforementioned feature 275 has been identified as a burial complex containing burials HB 5 through HB 12, which includes the triple younger subadult burials HB 9, HB 11, and HB 12. This complex (feature 275) is identified by Gregory (1980:243; also Magoon, 2010:53) as a “cemetery pit,” signifying the cultural relevance of overlapping and repeated burial occupation. Along with the variety a burial trends were the associated remains of canines to humans, which were a total of 8 associated canines to human burials.

The distribution of age estimations for individuals within the burial contexts of 44PG51, both subadult and adults, ranges from around the time of birth to approximately 60 +/- 5 yrs based on several age estimation criteria (Table 4.4). Within this distribution both male and female were identified. Of the total 37 individuals recovered from this site subadults represented over half (56.8%) of the burial population. Among the individuals classified as subadults, there is a relatively high concentration of individuals under the estimated age of three. The ratio of adult males to females remains almost even with the distribution of 8 males and 7 females.

Table 4.4
Paleodemographic Profile for 44PG51

Age Category	Male	Female	Sex Indeterminate	Total Individuals
Subadult I (0-5)	N/A	N/A	11	11
Subadult II (6-12)	N/A	N/A	5	5
Subadult III (13-17)	N/A	N/A	5	5
Young Adult I (18-20)	1	N/A	N/A	1
Young Adult II (21-34)	N/A	2	N/A	2
Middle Adult (35-49)	4	3	1	8
Old Adult (50-65)	2	1	N/A	3
General Adult	1	1	N/A	2
Total MNI	8	7	22	37

Dental Results

Skeletal data provide the opportunity to look past archaeological assemblages toward analyzing individuals linked to the past contexts being studied. Numerous analyses have been conducted through the use of human skeletal remains, more specifically human dentition, as a means to identify dietary regimes and nutritional markers (e.g. Blakey and Armelagos 1985; Dore, et al. 2010; Driscoll and Weaver 2000;

Gold 2004; Larsen, et al. 2007; Schroeninger 2009). Two of the dental markers examined in this study are the presence of carious lesions and enamel hypoplasias. Initial shifts from the hunter/gatherer subsistence classification to a horticultural/agricultural based subsistence are typically represented through the presence of dental caries. While slight increases in carious lesions is affiliated with the initial practice of the cultivation of native weedy plants *Chenopodium* and *Iva annua*, in the Eastern Woodlands the adoption of maize agriculture is most clearly linked to marked increases in dental caries rates (Gold 1999). Through the use of dental caries as a determinant for this shift, studies (e.g. Gold 2000; Hutchinson 2002) have been able to draw a link between carious lesions and subsistence patterning. Turner (1992:107) has argued that maize was an important dietary staple for late prehistoric Native Americans within the Coastal Plain, comprising at least half of and possibly as much as 75% of their total diet. Whereas, Custer (1989) views coastal maize cultivation as simply a single component of a larger, more generalized subsistence regime based upon a diverse array of wild resources and domestic products. Barfield and Barber (1992:232) have noted that "...agriculture is a misnomer for any prehistoric cultivation that took place in Virginia," and that the production of maize should be viewed instead as "...within the realm of extensive horticulture."

Dental analyses discussed in Gold (2004) examine the presence of dental caries and linear enamel hypoplasias through observations recorded for maxillary and mandibular dentition. In order to provide a comparable data set to these dental analyses the frequency of dental caries were identified and recorded for all teeth, which included deciduous and permanent dentition. Calculations were then categorized by the frequency

of the total number of teeth with dental caries, the frequency of carious teeth identified as molars, and the frequency of carious teeth based on the site of the dental caries (identified below). Also, analyses for linear enamel hypoplasias followed the methods identified by Gold (2004) and both maxillary and mandibular dentition were utilized regardless of side (left or right). The overall distribution of dentition for the Hatch Site utilized in this study varies when compared the normal distribution pattern identified by Gold (1999:181), illustrating the underrepresentation of premolars, while showing a slight overrepresentation of incisors, canines, and molars (Table 4.5).

Table 4.5
Distribution of Teeth at Site 44PG1

	Incisors	Canines	Premolars	Molars
Normal Dental Distribution	25.00%	13.50%	25.00%	37.50%
All Subadult	33.85%	15.77%	8.85%	41.54%
All Adult	22.45%	14.29%	25.31%	37.96%
Total Hatch Site Distribution	28.32%	15.05%	16.83%	39.80%

The burial population recovered from site 44PG51 demonstrated relatively good preservation, resulting in the ability to adequately estimate both age and sex for the individuals, in addition to identifying pathological lesions and other indicators of relative health. Of the 37 individuals represented, 546 teeth from both subadult as well as adult were associated with this burial population. There were a number of teeth that were lost post mortem based on the open sockets in the alveolar bone (where no resorption was identified) and as a result they were not counted while calculating carious lesion frequency (CLF). During the process of calculating the CLF several methods were used to distinguish any possible differences in lesion distribution. The first method used for calculations was to determine the caries percentage based on the total number of teeth. The overall frequency for the Hatch Site was calculated at 22.16%, which includes both subadult and adult skeletal remains (Table 4.6), thereby placing it into Turner's (1992; also Larsen 1997) category for an agricultural society. Based on Gold's (2004) distinction that occlusal caries are more representative of increased agricultural practices, the CLF's were calculated for both interproximal and occlusal dental caries (discussed in chapter 6). The overall patterns are readily apparent when the caries are assessed by age and sex categories. The process of dental caries begins during childhood, and the increasing numbers for all categories does have an apparent age-related component. The biggest difference noted for the expression of carious lesions is between males and females, with carious lesion frequency higher for males than females (Table 4.7).

As mentioned in chapter 2 there were more teeth used for the purposes of calculating the frequency for linear enamel hypoplasias. This is due to the completion level of the crown, where as long as the crown was complete and the occurrences could

be observed they were recorded. Enamel hypoplasias are formed during the development of the dentition when a physiological interruption occurs as a result from the surrounding environment, social or natural (Blakey, et al. 1994; Goodman and Armelagos 1985; Larsen 1997). The calculations for the presence of enamel hypoplasias incorporated a total of 561 teeth with an overall frequency at 17.83% (Table 4.8). Variations in the presence of hypoplasias exist among the adult population, where females have a frequency of 36.89% and the males have a frequency of 10.83%.

**Table 4.6
Dental Caries Data**

General Age Category w/Sex	Number of teeth	Number of Teeth w/Caries	% of Teeth w/Carious Lesions	% of Molars w/Carious Lesions
All Subadult	280	29	10.36%	17.59%
Adult Male	141	69	48.95%	53.68%
Adult Female	122	22	18.03%	23.45%
Adult Ind. Sex*	3	1	33.33%	33.33%
All Adult	266	92	34.59%	48.39%
Total Count/Frequency	546	121	22.16%	31.84%

* Adult sex estimation is indeterminate resulting in low tooth count & high %

Table 4.7
Dental Caries Data by Site

General Age Category w/Sex	Number of Teeth w/Caries	% of Carious Teeth w/Interproximal caries	% of Carious Teeth w/Buccal Labial Caries	% of Carious Teeth w/Occlusal Surface Caries
All Subadult	29	31.03%	17.24%	34.48%
Adult Male	69	34.78%	4.35%	39.83%
Adult Female	22	31.82%	0.00%	27.27%
Adult Ind. Sex*	1	0.00%	0.00%	100.00%
All Adult	92	24.79%	3.26%	33.70%
Total Count/Frequency	121	32.23%	6.61%	33.88%

Table 4.8
Frequency Data for Linear Enamel Hypoplasias

General Age Category w/Sex	Number of teeth	Number of Teeth w/LEH	% of Teeth w/LEH
All Subadult	295	47	15.93%
Adult Male	141	13	9.22%
Adult Female	122	38	31.15%
Adult Ind. Sex*	3	2	66.67%
All Adult	266	53	19.92%
Total Count/Frequency	561	100	17.83%

Chapter Five

The Edgehill Site (44CC29): Results and Preliminary Analysis

Site Description

Site 44CC29 was identified in 1968 through the presence of artifacts reflecting Native American occupation, such as ceramics and lithics, as well as the skeletal remains that were revealed due to plow-disturbance. Gallivan, et al. (2009:89) denotes the apparent ambiguity in the site nomenclature where the Edgehill Site is listed as 44CC130 in the state archives due to unforeseen circumstances; however, 44CC29 is the designation used during a dissemination of the site in the Chickahominy River Survey. Aspects of intrasite components pertaining to site chronology and burial contexts will be assessed in this chapter through the use of Gallivan (2009:89-109), which details the sites included in the Chickahominy River Survey.

Situated along the Western shores of the Chickahominy River, the Edgehill Site (44CC29) is located approximately 13 miles NNW of the Chickahominy and James River confluence (Map 5.1). Site 44CC29 is near the northern boundaries of Charles City County on the Mattahunk Neck peninsula and is adjacent to the mouth of Mill Creek. The boundaries of the site encompass approximately 7000 square feet (Figure 5.1), which included the excavation technique of dividing the units into 10 foot squares. Additionally, the site sets on a landform that rests approximately 20 feet above mean sea level (ASML), consisting of strata that were comprised of a plow zone layer of a dark brown sandy loam (.8 to 1.0 feet below surface level), followed by a yellow-brownish sandy subsoil. Identification of features and the material remains associated with this site

reflect a Late Woodland occupation. Several diagnostic artifacts as well as associated burial remains were utilized to determine this temporal period through the use of absolute seriation and radiocarbon dating (discussed below).



Map 5.1: Location of the Edgehill Site (44CC29).

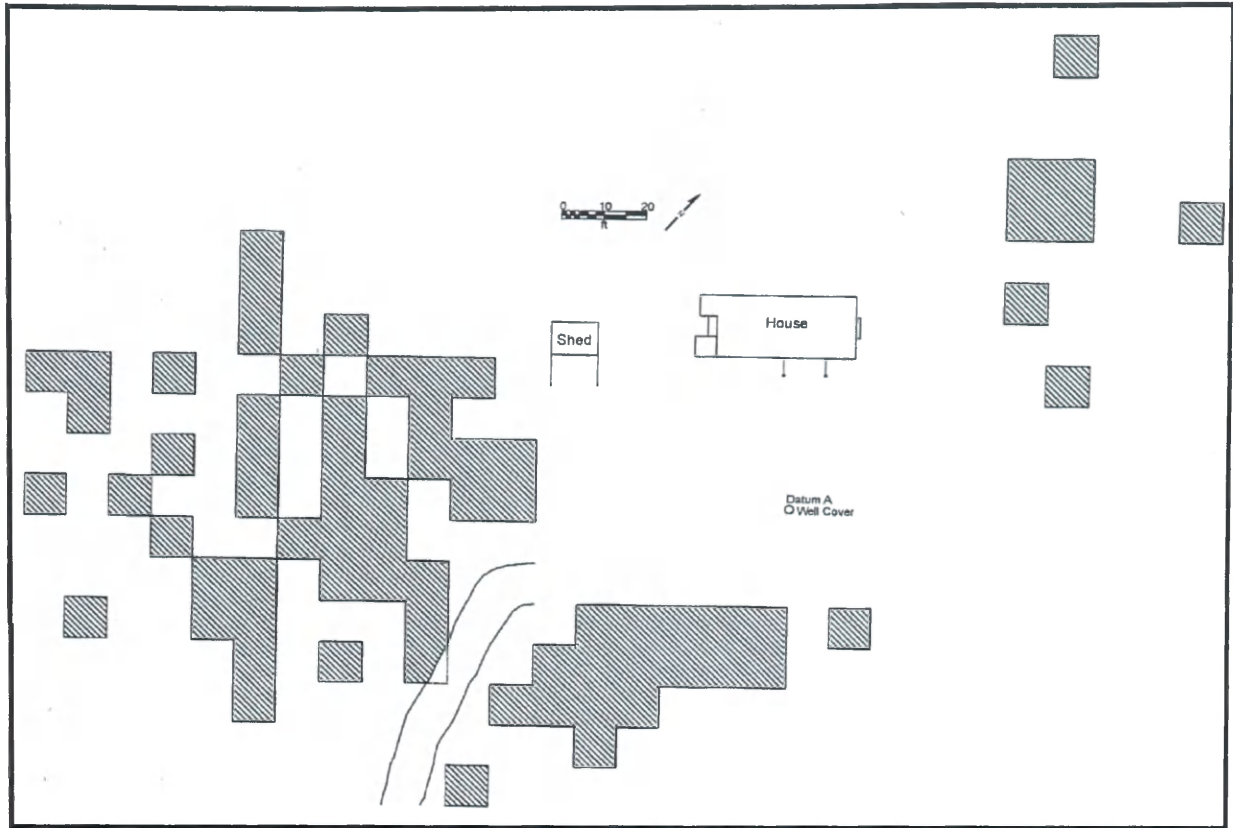


Figure 5.1: Plan view illustration of Site 44CC29 from Gallivan, et al. (2009:91).

Gallivan, et al. (2009:90) indicates that although the presence of some Native ceramics reflects Middle Woodland type pottery, other seriation dates provided are indicative of “occupations centered on the thirteenth and fourteenth centuries A.D....” Features excavated at Site 44CC29 not only assist in assessing an approximate chronology for the site, they also contribute to analyses conducted for reconstructing past social and cultural patterning. Based on recent radiocarbon dates for the burial features, bioarchaeological analyses of the burial components, Feature 4B3 (Ossuary 4) and Feature 9K3 (Ossuary 5), will provide a unique window into the lives of pre-contact

Native populations, with regards to subsistence practices, inhabiting the Inner Coastal Plain region of Virginia during the Late Woodland I period. Analyses of the dentition from Ossuaries 4 and 5 have allowed for inferences to be made regarding the utilization of horticultural practices as a component of the dietary regime for the communities represented by these burial components. Through the comparative study of the Edgehill and Hatch Site human dentition, questions regarding the use of domesticated plants can now be addressed pertaining to the practices of horticulture, as well as temporal trends, during the Late Woodland I period.

Human skeletal remains recovered from Site 44CC29 were representative of a mortuary program entailing mortuary processing and secondary burial practices. Unlike the Hatch Site (44PG51), where the mortuary program involved wide spread primary single interments without the presence of ossuaries (discussed in chapter 4), ossuaries were used as the form of interment. A total of five ossuaries were identified, which remained fairly uniform with one another, varying in burial population size and associated burial practices (Gallivan, et al. 2009:97). Radiocarbon dates were provided for the ossuaries based on the dating of human skeletal material from within each of the individual burial populations (Gallivan 2011). The burial components utilized for analyses within this study, Ossuaries 4 and 5, are associated with the Late Woodland I period based on the aforementioned radiocarbon dates. This temporal association, in addition to the geographic association, indicates that the burial populations from the Hatch Site and Ossuaries 4 and 5 (the Edgehill Site) provide comparable data sets for bioarchaeological analyses. After direct consultation, consent was given by the Chickahominy Tribal Council for conducting radiocarbon dating of human skeletal

materials. Testing of these materials began prior to start of the dental data collection and analysis processes conducted for this study. Also, analyses based on sex and specific age will not be presented here due to the comingled nature of the burials; whereas, the single interment burial program from Site 44PG51 allowed for complete analyses for each individual when preservation and lack of disturbance allowed for it.

Chronological Indicators

In order to provide an approximate chronology for the Edgehill Site several indicators were utilized. Examinations of the material remains including Native ceramics reflected an overall site occupation ranging from the Middle Woodland period (ca. A.D. 200-900) through the Late Woodland period (ca. A.D. 900-1600). Information provided by Gallivan, et al. (2009) illustrates the possible association between the burial features within the site's boundaries and village occupation. Thus, the timeline for Site 44CC29 consists of the creation for the burials at the site. Methodologies used for establishing dates for a pre-contact Native presence at the site includes seriation dating both uncalibrated and calibrated as well as radiocarbon dating (Gallivan, et al. 2009:109). The radiocarbon dates identified below were obtained through samples of from pit features as well as the ossuaries present.

A combination of both Townsend and Mockley series ceramic were recovered from various archaeological features. Of the Townsend series ceramics, Rappahannock incised and Rappahannock fabric-impressed comprised a total of 19% of the pottery from Site 44CC29, which is the largest amount of any one ceramic type from this site (Gallivan, et al. 2009:103). The entirety of Mockley series ceramics contributed to 21%

the ceramics, Ossuary 3 is older than Ossuary 2, based on radiocarbon dating (Ossuary 2= 350+/-40 bp; Ossuary 3=550+/-40 bp). The most recent burial contexts are the Features 3F2 (Ossuary 1) and 1V3 (Ossuary 2).

Table 5.1
Site 44CC29 Ossuary Dates

Burial Feature	Seriation Date (bp)	One-Sigma Seriation Range (A.D.)	C14 Conventional Age (bp)	C14 Two-Sigma Range (A.D.)
Ossuary 1 (Feature 3F2)	489	A.D. 1256-1950	290+/-40	A.D. 1480-1660
Ossuary 2 (Feature 1V3)	713	A.D. 1042-1448	350+/-40	A.D. 1450-1650
Ossuary 3 (Feature 2W4)	498	A.D. 1229-1950	550+/-40	A.D. 1310-1440
Ossuary 4 (Feature 4B3)	729	A.D. 1021-1442	1030+/-40	A.D. 900-1040
Ossuary 5 (Feature 9K3)	721	A.D. 1022-1445	980+/-40	A.D. 990-1160

Burial Contexts

The mortuary program utilized from Site 44CC29 is representative of fairly consistent burial practice regimes occurring during the span of the Late Woodland period, though some variations do exist. Until recently, the ossuary identified at the Governor’s

Land Site (44JC298) was the oldest dated ossuary (ca. AD. 1245+/-125) within the Virginia Coastal Plain region. The aforementioned dates discussed in the previous section indicate that the use of secondary burial practices at Edgehill preceded the one identified at Governor's Land Site and involve a variation of the treatment of human skeletal material (Gallivan, et al. 2009; Magoon 2010; Turner 1992). Also, the ossuaries appear to be indicative of communal and/or familial based burials, given the overall sizes of the burial populations. The distribution of the burials places Ossuaries 1-4 in approximately the northwest quadrant of the site, whereas Ossuary 5 (9K3) is located in the southeastern quadrant (Figure 5.2a; Figure 5.2b).

The burial contexts reflect the general methods utilized during the secondary interment process at the Edgehill Site. All five of the ossuary burials appear to have been constructed in an elliptical shape with the axis on an approximate northwest to southeast orientation, which took place in the yellowish-brown sandy subsoil (Gallivan, et al. 2009:97). Evidence based on the soil deposits, or lack thereof, collected during the excavations of the burial revealed that pits themselves were utilized and then closed after a relatively short window of time, which is indicated by the relative proximity of skeletal materials in association with one another. Although the general construction of the burials appears to be similar, variations exist between the ossuaries with regards to treatment of human skeletal remains. While the oldest ossuary 4B3 (Ossuary 4) contains no discernable burial attributes, such as the presence of associated canines, the most recent ossuaries, 1V3 and 3F2, demonstrate that fire treatment was utilized during the mortuary process. Additionally, Ossuary 2 reflects the intentional placement of cranial material along a linear axis. Ossuary 5 contained both ceramic material as well as shell

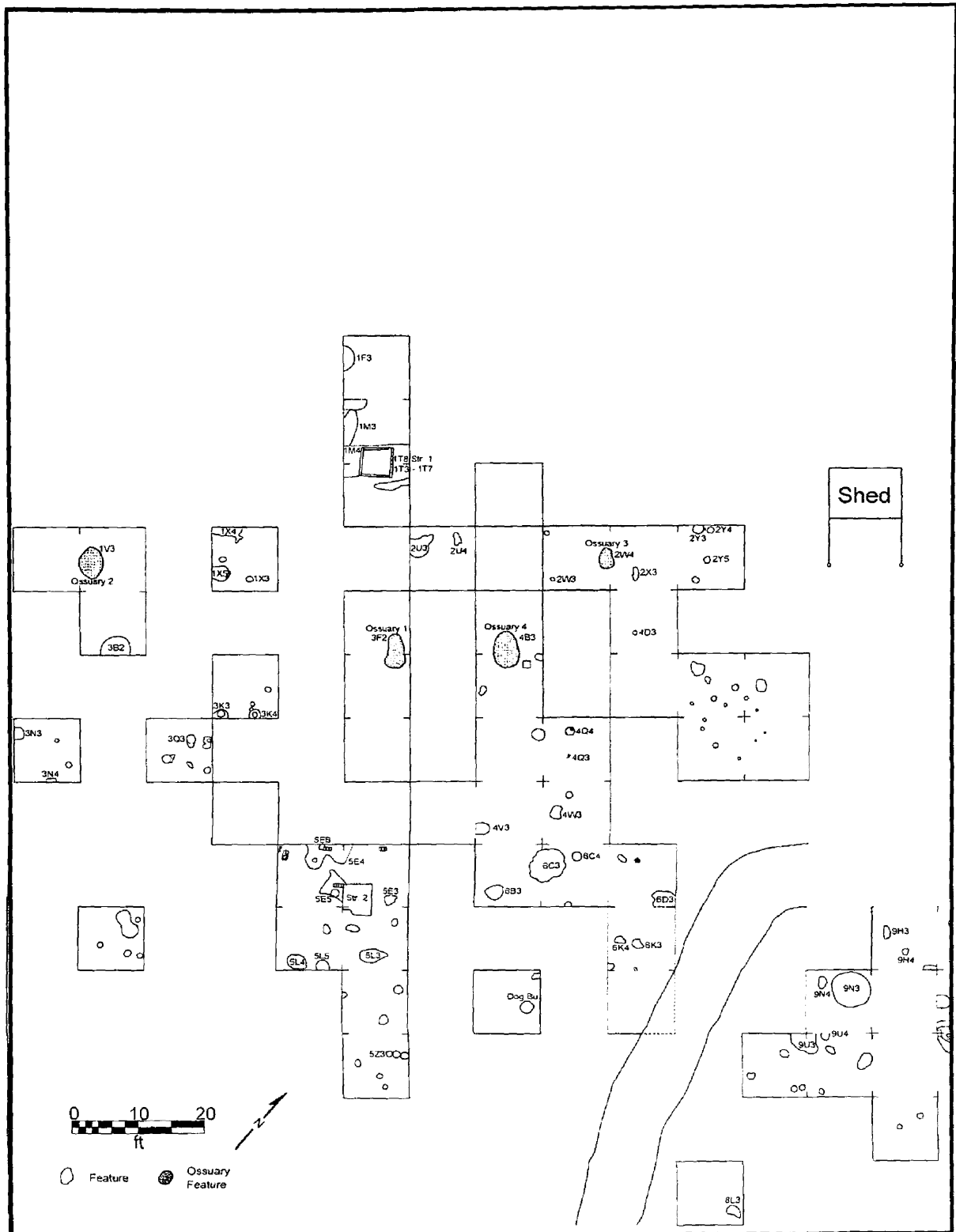


Figure 5.2a: Plan view of Edgehill Site (44CC29) depicting archaeological features (Gallivan, et al. 2009:92).

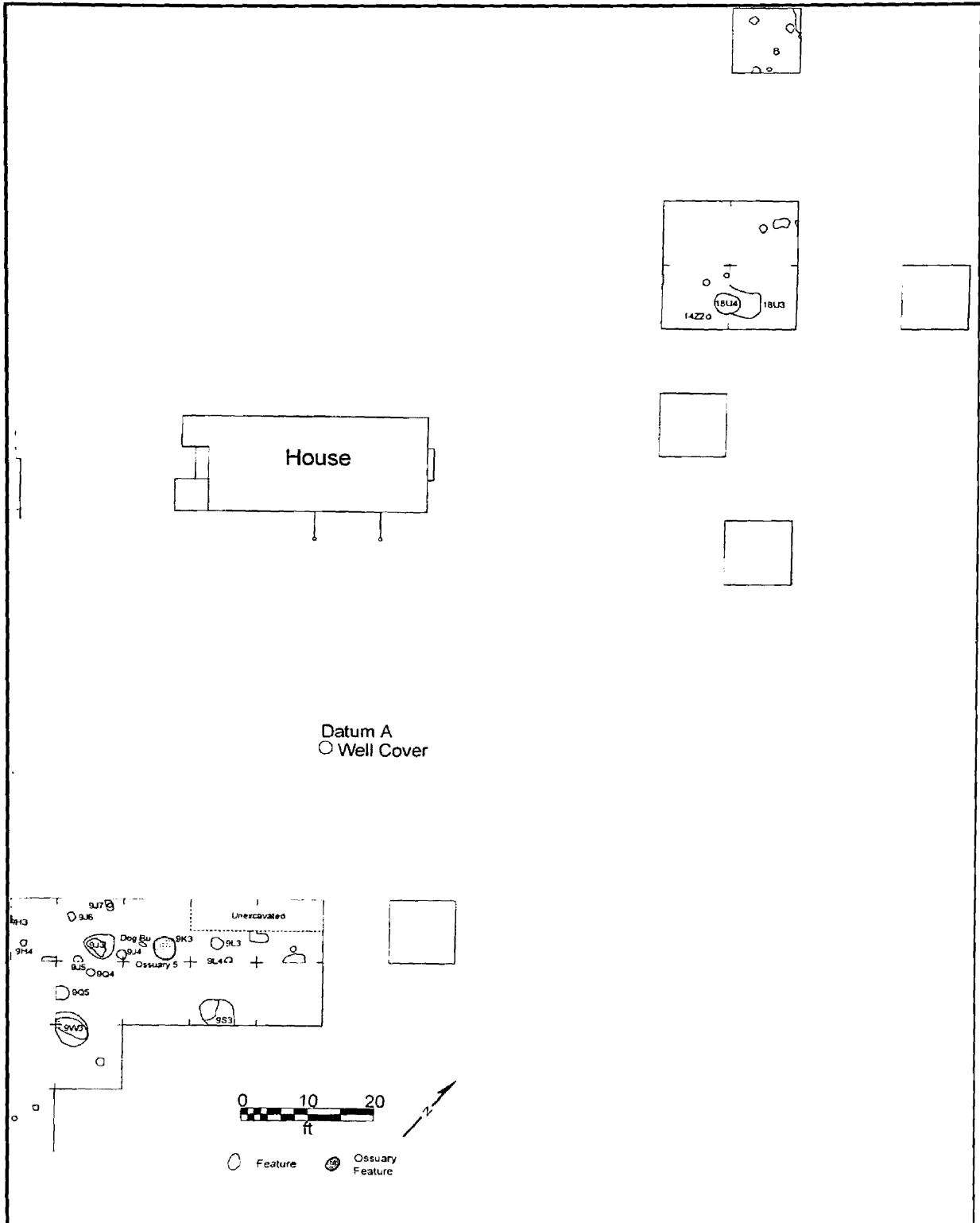


Figure 5.2b: Plan view of Edgehill Site (44CC29) depicting archaeological features (Gallivan, et al. 2009:93).

beads, which were cylindrical in shape and measured approximately 15.5-39.4 mm in length (Gallivan, et al. 2009:98). Although faunal remains were recovered from the burial contexts at the site, the only burial feature associated with a dog burial was Feature 9K3 (Ossuary 5).

The average minimum number of individuals (MNI) for ossuary burial populations within the Virginia coastal plain ranges from 10-20 individuals during the Late Woodland period; however, larger ossuaries associated with the introduction of the Potomac Creek Complex along the northern Virginia coastal plain can house well over 60 individuals per burial (Curry 1999; Magoon 2010; see also Potter 1993). The MNI for the ossuaries at Site 44CC29 follows this trend for the region, where they are present within proximity of the James River. Indicated by Table 5.2, three of the burials contain an MNI within the range of 10-20 individuals, while Ossuaries 3 and 5 housed just outside of the range (also Gallivan, et al. 2009:98-100). Ossuary 5 was the largest and second latest burial, containing a total of 26 individuals and dating to Late Woodland I. The most notable of the burials was Ossuary four, which, based on radiocarbon dates, indicates that burial is currently the oldest dated ossuary in the Coastal Plain region, comfortably situated in the first half of the Late Woodland I subperiod. The overall MNI count for the collective burial contexts is at 78 individuals, reflecting the continued use of the ossuary mortuary program throughout the Late Woodland period.

Table 5.2
General Age and Sex Classifications

Ossuary (Feature)	Subadult	Adult Male	Adult Female	General Adult	Age/Sex Not Determined	MNI
1 (3F2)	3	2	6	2	3	16
2 (1V3)	2	1	2	3	2	10
3 (2W4)	3	1	2	0	2	8
4 (4B3)	6	4	7	0	1	18
5 (9K3)	10	6	7	0	3	26
Total						78

Due to the lack of articulation of the interred individuals as well as the lack of bundled human remains, it is often difficult to assess specific age and sex distributions for each represented individual (Gold 1999). Within the Edgehill Site burial contexts, both adults and subadults are represented, as well as both male and female individuals. While some associated remains were identified, indicated by Gallivan, et al. (2009:97). Although the majority of individuals from within these burial contexts were assigned an age and/or a sex classification, there are some individuals who could not be placed within an estimated category. Due to the comingled nature of Edgehill's burial contexts and the non-articulated dentition, which made individual associations difficult or impossible to determine, general trends in dietary and nutritional markers will be provided at the group level rather than at the individual level.

Dental Results

While the data obtained from the ossuaries within the Edgehill Site burial contexts is invaluable, the trends cannot not be categorized as specifically as the dentition data obtained from individuals within a single-primary interment context. The skeletal materials from Ossuaries 1-5 are both disarticulated and comingled, which includes dentition. Although some teeth remain articulated in the maxillas and mandibles from the burial features, the amount of unassociated loose dentition makes it difficult to provide any adequate initial estimation of diet and nutrition based on age and sex. As a result general patterns of dietary and nutritional markers will be noted at the burial population level. Ossuaries represent more confined regions of time and typically are associated with familial or communal relationships (Curry 1999; Magoon 2010). Whereas, single-primary interment mortuary practices, such as the Hatch Site cemetery, provide in-depth information about the individuals; however, it is often difficult to establish relationships between the interred individuals both communally and familial.

The results contained within this chapter will only include data from Ossuaries 4 and 5. The dental distribution pattern for Ossuaries 4 and 5 vary slightly with a 5% difference in the presence of incisors and the approximately 6% difference is the amount of molars present in the sample. Gold (1999:181) provides the normal dental distribution for a burial population, which consists of incisors (25%), canines (13.5%), premolars (25%), and molars (37.5%). The dental distribution demonstrated within Ossuaries 4 and 5 have a slightly overrepresented distribution of molars, and the distribution for incisors are slightly underrepresented (Table 5.3). Variations in dental distribution for secondary burials are often associated with either antemortem tooth loss or the loss of dentition

during the transport stage of the secondary interment process (Gold 1999). A comparison between the Edgehill Site and Hatch Site burial populations illustrates a slight difference in canine and molar distribution. However, premolars for Hatch Site are more underrepresented than those for the Edgehill Site burials and the incisors for the Hatch are slightly overrepresented; whereas, the incisors for both Edgehill Site ossuaries are underrepresented.

Table 5.3
Distribution of Teeth at Site 44CC29 for Ossuaries 4 and 5

	Incisors	Canines	Premolars	Molars
Normal Dental Distribution	25.00%	13.50%	25.00%	37.50%
Ossuary 4/4B3 (n=275)	20.88%	14.29%	23.44%	41.39%
Ossuary 5/9K3 (n=196)	15.74%	13.71%	22.84%	47.72%
The Hatch Site	28.32%	15.05%	16.83%	39.80%

The radiocarbon dates provided for Ossuaries 4 and 5 provide them with a Late Woodland I temporal association. Based on overall tooth presence, calculations provide and overall carious lesion frequency of 11.36%, which, according to Turner's

classifications (Larsen 1997; Magoon 2010) and Barfield and Barbers (1992) assertions places this burial population within the realm of horticultural. Although the mean for agricultural/horticultural group is identified at 8.6% for the carious lesion frequency, the estimated threshold for the division in subsistence practices is at 7%. As noted by Milner (1984) and Larsen et al. (1991) a good “rule of thumb” for estimating dietary regime from dental remains is focused upon the seven percent threshold for carious lesion frequency, especially within the Eastern Woodlands region (Larsen 1997:68). Ossuary 5 has an overall carious lesion frequency of 18.88%, which illustrates an overall trend increase from Ossuary 4’s frequency and providing an association with the horticultural classification (Table 5.4). Additionally, carious lesion frequencies based on the site of the lesions and ossuary burial populations are illustrated in Table 5.5.

In opposition to the increased trend represented in the carious lesion frequency, is the decreased trend in the frequency of linear enamel hypoplasias. There was a slight increase in the number of teeth used for the calculations of linear enamel hypoplasia frequencies based on linear grooves in the enamel (discussed in chapter 2) (Table 5.6). Again, although trends based on age and sex estimations were not calculated, an overall calculation was made for each of the ossuaries. Of the 275 teeth used in Ossuary 4’s calculation, 37.82% had the presence of linear enamel hypoplasias. Additionally, there does appear to be any relationship between those teeth with dental caries and those with linear enamel hypoplasias. It is important to remember that due to the comingled nature of the human skeletal material from Ossuaries 4 and 5 adequate analyses for the burial populations were not possible. Though there does not appear to be a marked difference in frequencies between burial populations, where the frequency of Ossuary 5 was

calculated at 34.17%, there is an interesting pattern when considering the increase in the occurrence of carious lesions (discussed in chapter 6).

**Table 5.4
Dental Caries Data**

Ossuary (Feature)	Total Number of Teeth	Total Number of Molars	% of All Teeth w/Caries	% of All Molars w/Caries
Ossuary 4 (4B3)	273	93	11.36%	17.70%
Ossuary 5 (9K3)	196	26	18.88%	27.96%

**Table 5.5
Dental Caries Data by Site**

Ossuary (Feature)	Number of Teeth w/Caries	% of Carious Teeth w/Inter-proximal caries	% of Carious Teeth w/Buccal Labial Caries	% of Carious Teeth w/Occlusal Surface Caries
Ossuary 4 (4B3)	31	16.13%	6.45%	25.81%
Ossuary 5 (9K3)	37	10.81%	18.92%	32.43%

Table 5.6
Frequency Data for Linear Enamel Hypoplasias

Ossuary (feature)	Number of teeth	Number of Teeth w/LEH	% of Teeth w/LEH
Ossuary 4 (4B3)	275	104	37.82%
Ossuary 5 (9K3)	199	68	34.17%

Chapter Six

Bioarchaeological Analysis: Dental Patterning

The region identified as the Coastal Plain of Virginia offered a diverse range of resources utilized to meet the dietary needs of the Native people during the Late Woodland period. Although the human-nature relationship that existed began much earlier than A.D. 900, the focus of this study examines only the potential dietary regimes between ca. A.D. 900-1600. Research examining the potential subsistence patterns within the Eastern Woodlands has provided insight into the interplay between pre-contact Native American and both faunal as well as floral resources (e.g. Fritz 2000; Hammett 2000; Rose 2008). While some research over the past two decades has associated the onset of horticulture/plant domestication with the introduction of plants such as maize (*Zea mays*), more recent studies, such as Rose (2008:413), identifies maize as a secondary domesticated plant type. Several lines of evidence have been utilized elsewhere in the Eastern Woodlands outside of the Chesapeake Region in order to provide more detailed dietary reconstructions, including the archaeobotanical record, bioarchaeological analyses (ie. stable isotope analysis, dental caries, etc.), faunal analyses, and paleobotanical variations (ie. regional plant resources) (Gremillion 2003; Hodges and Hodges 1994; Scarry 2003; Schoeninger 2009).

Unlike the inland regions of the Eastern Woodlands, such as the Piedmont and Ridge and Valley physiographic provinces of Virginia, where European accounts during the Contact era provide little information, there exists numerous accounts from the Coastal Plain of Virginia reflecting the social and cultural landscape. Although European

accounts depict resource exploitation and allow for adequate patterns of dietary reconstruction, data availability prior to this period becomes limited as researchers attempt to sift through the archaeological record (Barfield and Barber 1992; Rountree 1993; Turner 1992). This study provides direct, individual indicators of possible subsistence patterning during the early Late Woodland period through analysis of the prevalence of both dental caries and enamel hypoplasias. Pearsall (2009:610) identifies direct indicators as "...those that assess diet and health from the human body itself." Trends during the processes of reconstructing subsistence and nutrition patterns illustrate that the shift to plant domestication is a series of transitions in dietary regimes, including the combination of both wild plant and domesticated plant (Pearsall 2008:609; Schoeninger 2009; see also Larsen 2001). The data provided in this study are indicative of a shift in subsistence practices, suggesting that while data from one burial population reflects a period of transition toward increased horticulture, the other burial populations represent communities utilizing more extensive horticultural practices.

Types of Dental Analyses

Two types of analyses that are complimentary to the floral material identified in the archaeological record involve a direct examination of human skeletal remains, which provide a more representative examination of past populations. Human teeth, as asserted by Gold (1999:243), "...are the locus of primary interaction between the body and the food that is consumed." Thus analyses of dentition are necessary for a more complete record of subsistence patterning. The chemical level of analysis for human dentition is referred to as Stable Isotope Analysis, where carbon and nitrogen isotopes are utilized to examine levels of dietary patterning. These isotopes are identified as $^{12}\text{C}/^{13}\text{C}$ and $^{15}\text{N}/^{14}\text{N}$

and are the most common used in bioarchaeological reconstructions of diet (Larsen, et al. 2001:55; Hutchinson 2002; Rose 2009; Schoeninger 2009).

Nitrogen isotope ratios $^{15}\text{N}/^{14}\text{N}$, as indicated by Schoeninger (2009:636), are most accurately indicative of the presence of marine resources in the diet, represented as $\delta^{15}\text{N}$. The photosynthetic pathways exhibited in plant resources consumed by Eastern Woodland populations are identified as C_3 or C_4 during this type of analysis, with C_4 plants demonstrating less negative isotope ratio ($\delta^{13}\text{C}$) values than the C_3 plants (Larsen, et al. 2001:55-56). The pathway utilized by C_3 plants is indicative of plants native to the Eastern Woodland region and other temperate plants, whereas the C_4 pathway is indicative the presence of tropical grassy plants such as maize, when identified within this region (Gold 1999:238). Studies conducted within the Eastern Woodland boundaries have utilized this type of analysis in order to assist in the dietary reconstructions of archaeological populations (e.g. Gold 2004:86-88; Hutchinson 2002:151-154). Through her bioarchaeological analysis of subsistence patterns in the Late Woodland Virginia Piedmont, Gold (2004:87) identified that maize was a component of the dietary strategies within this region during the Late Woodland I period. Additionally, carious lesion frequencies were examined in order to determine the possibility of horticultural/agricultural practices utilized by these burial populations. The combination of both the stable isotope data and the presence of dental caries demonstrates that although the presence of dental caries do not account for the level of cultigen exploitation their levels do lend insight into the presence of horticultural practices.

The examination of dental caries is the second type of analysis involving human dentition as a direct means to examine subsistence practices. Calculating the total

percentage of dental caries (carious lesion frequency) is considered a macro level analysis based on the presence of paleopathological lesions. Shifts in subsistence patterns from foraging based group to horticultural based groups are accompanied by shifts in social and cultural factors, such as settlement patterning and organization, resource exploitation, food preparation, health, etc. (e.g. Gallivan 2003; Gold 2004; Reeves 2000). Larsen (1997:67-69) notes that shifts in both food preparation as well as diet can be reflected in the increase in dental caries, though other factors do contribute. Within the Eastern Woodlands, increases in dental caries rates are often attributed to the incorporation in maize into the diet. Numerous bioarchaeological analyses have been conducted on burial populations associated with the Eastern Woodlands region during the Late Woodland period utilizing carious lesion frequencies to illustrate subsistence practices.

Gold (2004) and Hutchinson (2002) conducted studies that included burial populations in regions adjacent to the burial populations examined for this study. The scope of Gold's (2004:90) examination focuses on human skeletal remains from burial mounds identified in the Piedmont region of Virginia. This research includes the calculations of the dental caries rates for these burials, ultimately reflecting the use of horticultural practices with maize as a component of the diet (regional comparisons discussed below). The data provided within these studies are comparable based on similarities in temporal associations, which fall within the range of Virginia's Late Woodland period. However, the data sets vary based on geographic affiliation, where Gold's (2004) analyses focus on the Virginia Piedmont and Ridge and Valley physiographic provinces, and Hutchinson's (2002) analyses focus on the Coastal Plain region of North Carolina. Additionally, Hutchinson (2002:139) identifies the similarities

in the carious lesion frequencies of the populations examined in his research; however, he distinguishes differences in diet based on stable isotope analysis, indicating distinctions between Inner and Outer Coastal Plain groups (see chapter 2).

Resource Exploitation

During the contact era, accounts of Native subsistence practices illustrate the variety of inclusion from multiple resources. Among the Powhatan people food sources included cultivation of domesticates, such as maize and bean, as well as the harvesting of wild nuts and berries (Rountree 1993:27; also Rountree and Turner 2002). From what appears in historical document it is clear that while extensive horticultural practices were present, coastal Native Americans also incorporated wild resources into their diet regimes. These resources also varied depending on the seasonal availability and the relative proximity to the various estuary zones (Gallivan 2003:91; Rountree 1990:6-7).

According to John Smith (ca. A.D. 1580-1631):

“In March and April they live much upon the fishing weares, and feed on fish, turkies and squirrels. In May and June they plant their fields and live most of acorns, walnuts, and fish. But to mend their diet, some disperse themselves in small companies and live upon fish, beastes, crabs, oysters, and torteyses, strawberries, mulberries, and such like...” (qtd in Barfield and Barber 1992:227).

Historical accounts such as this assist in recognizing the characteristics of Native American subsistence patterns witnessed during the contact era. Several archaeological sites that date to this era and earlier contain assemblages where similar faunal and floral material have been recovered and identified, indicating that although populations were sedentary, the use of mixed subsistence exploitation was practiced, such as the Paspahigh Site (44JC308) (Hodges and Hodges 1994; Rountree and Turner 2002).

Evidenced through the archaeological record, contexts have revealed both faunal as well as floral material, depicting the exploitation of natural resources in order to supplement nutritional demands (Dent 1995:251-252; Hodges and Hodges 1994; Smith 1984). Commonly recovered from Late Woodland sites are the remains of aquatic fauna, including mussels, oysters, various species of catfish, etc., in addition to the terrestrial fauna identified as deer, raccoon, etc. (Dent 1995; Turner 1992). At Site 44JC308 white-tailed deer (*Odocoileus virginianus*) comprised approximately 0.32% of the identified material, which markedly less than the amount of long-nosed gar (*Lepisosteus osseus*) elements collected (92.17%); however, the presence of deer remains follows a continuum reflecting the dominance of the exploitation of white-tailed deer throughout the Late Woodland Period (Hodges and Hodges 1994:293; also Gallivan, et al. 2009). Although exploitation of various species of fauna and the harvesting of wild flora is apparent based on material identified from archaeological features, the presence of domesticated material is limited.

While the identified exploitations of wild fauna and flora allow for human-nature interactions to be ascertained, they do not allow for an adequate assessment of the shift to horticultural practices within the Coastal Plain of Virginia. As Dent (1995:254; also Rountree and Turner 2002:75; Turner 1992:106-107) point out, there is archaeological evidence of domesticated cultigens available, though the amount is limited. This is a key component of the debate still existing for this region, where some archaeologists venture to argue the adoption of horticultural/agricultural practices as a major component of subsistence accompanied European contact. Whereas others suggest that the shift towards horticulturally based dietary practices occurred sometime during the Late Woodland

period (Dent 1995; Dore, et al. 2010; also discussed in chapter 4). In recent years, studies reexamining the dating of cultigens (ie. maize cupules) have provided more accurate dating methods and analyses, which assist in reconstruction of subsistence shifts to horticultural in coastal Virginia (e.g. Gallivan and Mcknight 2008). These shifts coincide with patterns of increased sedentism and help to explain potential social and cultural environments that may not have otherwise been noted.

Dental Caries Rates

Though the calculations for carious lesion frequencies for Site 44PG51 (Hatch Site) and Site 44CC29 (Edgehill Site) suggest that the burial populations are representative of communities utilizing horticultural practices, variations do exist between the percentages. The overall range of the burials dates to approximately ca. A.D. 900-1200 with Ossuary 4 as the earliest component with a date range of A.D. 900-1040 and the Hatch Site burials relatively contemporaneous with Ossuary 5. As discussed in chapters 3 and 4 two different mortuary programs are represented at each of the sites, allowing for multiple levels of interpretations both intrasite as well as intersite. The burial practices present at Site 44PG51 are predominantly primary-single interments, with one possible secondary interment. Site 44CC29 consists of five ossuary and no primary single interments, lending insight towards group subsistence based on a more confined span of time and a better defined relationship between individuals.

Beginning with the earliest of the burial contexts, the overall carious lesion frequency exhibited by Ossuary 4 is at 11.36% indicating that it is about the threshold of 7%, which does place it within the realm of horticultural subsistence. Based on Turner's classification system (see Larsen 1997:68), this level of dental caries, though in the

agricultural category, is not markedly higher than the 8.6% average. The difference between Ossuary 4's frequency, with a significance level of $P=.05$, is not statistically significant. This means the pattern seen in the dental pathology is not indicative of the presence of maize within the dietary regime; however, the inference can be made that this slight increase in carious lesions suggests the use of local plant life through horticultural practices. As suggested by Gold (1994:92), "The initial cultivation of native weedy plants such as *Chenopodium* and *Iva anna* may be associated in some areas with a slight increase in caries rates." It is important to note that while a caries frequency of 11.36% might not reflect the incorporation of maize horticulture, Driscoll and Weaver (2000) provide data, indicating a carious lesion frequency of 9.2% with a $\delta^{13}\text{C}$ value at -12.9‰ (indicative of a C^4 pathway).

The first pattern to emerge based on dental caries is the marked increase in the carious lesion frequency of Ossuary 5. The carious lesion frequency for Ossuary 5 (9K3) at the Edgehill Site was calculated at 18.88%, placing this representative community well within the range ascribed to agriculturalists. The date provided for this burial context is ca. A.D. 990-1160, which makes this feature the second oldest burial at Site 44CC29. The difference between carious lesion frequencies from Ossuaries 4 and 5 is statistically significant ($P\leq.05$; Chi-Squared), indicating that there is a temporal trend present (Figure 6.1). This shift in lesions provides evidence suggesting that horticulture practices have become more extensive. This allows for a couple of inferences to be made based on Larsen's (1997:69) and Gold's (2000:208) assertions that maize is the cultigen that is most readily associated with increased dental caries, due in part to its cariogenic nature and the presence of sucrose.

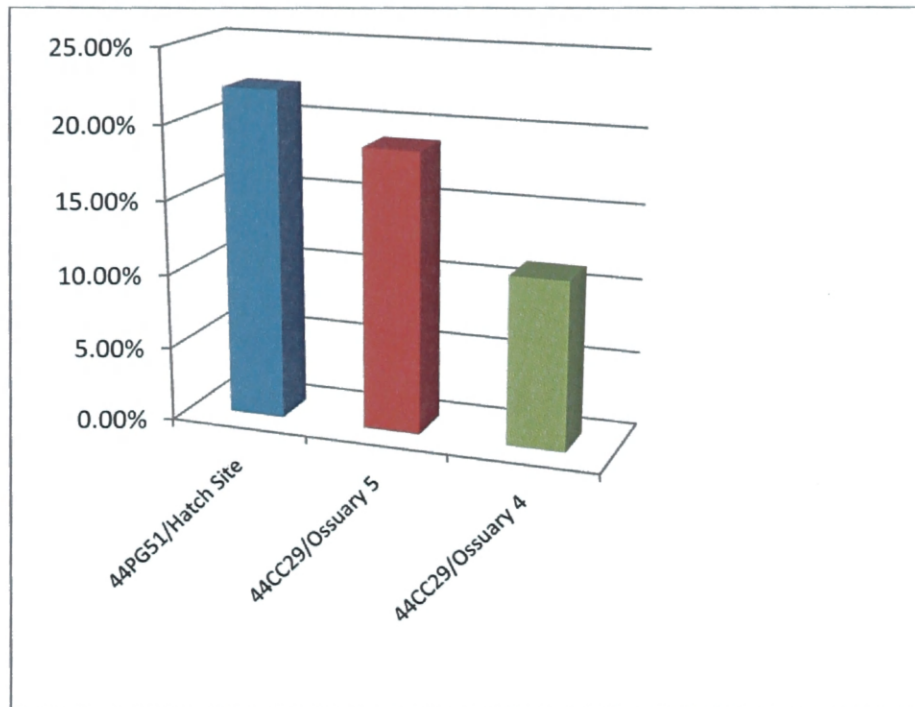


Figure 6.1: Comparison of overall carious lesion frequency of burial contexts within study.

The elevated caries rate is indicative of horticultural practices with the presence of maize as a component of the diet, but other resources would continue to be utilized especially because domesticates are seasonal. Additionally, this marked increase provides evidence suggesting the burial population from Ossuary 4 (Feature 4B3) represents a community or family, whose subsistence practices denote a period where

dietary regimes have begun to shift to more sedentary villages increasing the use of horticulture as identified in middle range societies (Figure 6.2). The burial population from the Hatch Site dates to the Late Woodland I period as well, illustrating an overall carious lesion frequency similar to that of Ossuary 5.

Discussed in chapter 4, the overall carious lesion frequency for the Hatch Site was calculated at 22.16%. The use of statistical analyses indicates that the difference in caries rates between Ossuary 5 and the Hatch Site burial population is not statistically significant. Other regional research expresses the occurrence of variations within carious lesion frequencies at the regional level (e.g. Driscoll and Weaver 2000; Gold 2004; Hutchinson 2002; Reeves 2000). Based on the frequencies calculated for this study all three of the Late Woodland I burial populations indicate either a shift towards or the practice of more horticulturally based communities. The primary-single interment program at Site 44PG51 lends further insight into the dietary variations at the individual level. The biggest difference noted for the expression of carious lesions is between males and females, with carious lesion frequency higher for males than females. The difference between male carious lesion frequency, which is 48.95%, and female carious lesion frequency (18.03%) is statistically significant ($P \leq .05$). In many cases, and especially for late prehistoric and contact period sites in eastern North America, females tend to have higher frequency rates than males, particularly within agricultural societies (Larsen 1997:72-73). In this regard, the patterning observed for the Hatch Site burial series definitely goes against observed trends.

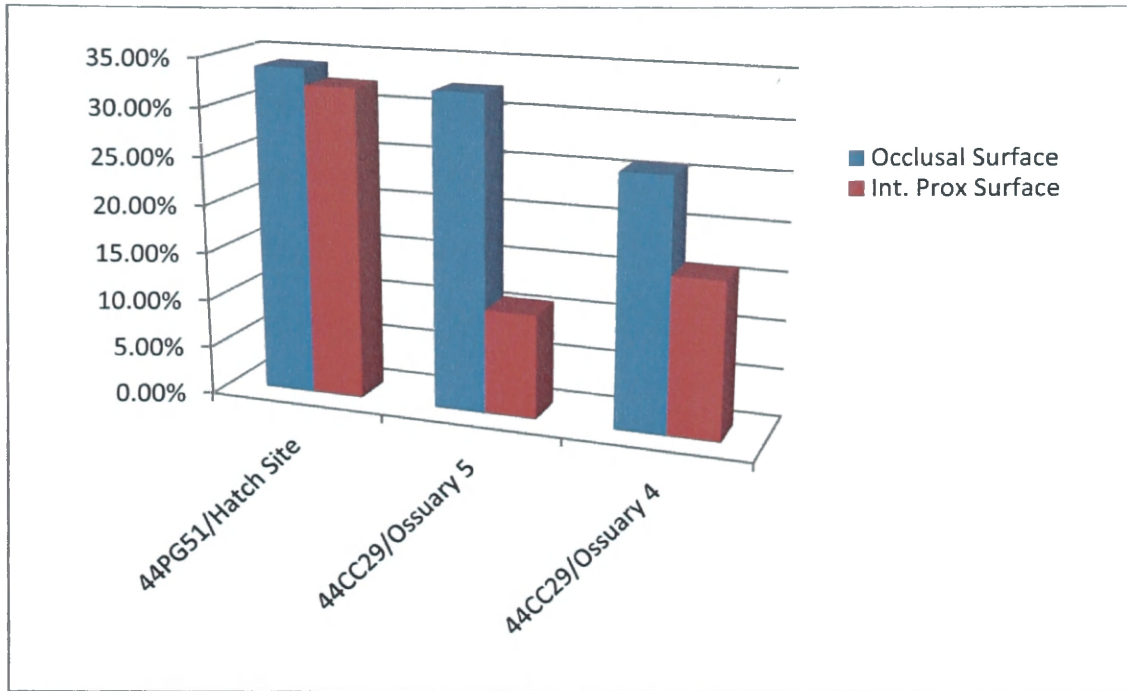


Figure 6.2: Comparison of caries data per surface location.

When compared to the burial mound populations in the Piedmont region, it is apparent that the later Late Woodland I groups within this study, the Hatch Site and Ossuary 5 burial populations, exhibit a similar range of frequencies. The data provided from all three assemblages demonstrate that a temporal trend is present in the development of dental caries. Ossuary 4's (ca. AD. 900-1040) carious lesion frequency (CLF) was calculated at 11.36% while Ossuary 5's (ca. AD. 990-1160) CLF is 11.88% and the Hatch Site's (ca. AD. 1010-1273) CLF is 22.16%, which reflects the increased incorporation of horticulturally based subsistence practices and domesticates. Additionally, regional data provided by Gold (2004:124-125) expresses carious lesion frequencies between 20-30%, such as the Lewis Creek Burial Mound, which dates to the

Late Woodland I period, has a frequency of 24.9% (Table 6.1). Although variations are present among the carious lesion frequencies for the burial mounds, the Hatch Site, and Ossuary 5's, the differences in these frequencies are not significant. However, the difference between Ossuary 4's carious lesion frequency and the frequencies for the Virginia burial mound populations is statistically significant. Burial contexts in adjacent regions with similar or lower frequencies of carious lesions combined with stable isotope data have made it apparent that it is possible for C⁴ cultigens, such as maize, to have been incorporated into the dietary regimes of the Inner Coast Plain region of Virginia.

Table 6.1
Regional Comparison of Dental Caries Rates

Site/Region	Period	Caries Frequency	Reference
Hatch Site/VA Coastal Plain	VA-Late Woodland I	22.16%	Chapter 4
Edgehill Site (9K3)	VA-Late Woodland I	18.88%	Chapter 5
Edgehill Site (4B3)	VA-Late Woodland I	11.36%	Chapter 5
Lewis Creek Mound/VA Ridge and Valley	VA-Late Woodland I	24.90%	Gold 2004
Hayes Creek Mound/VA Ridge and Valley	Late Prehistoric	29.20%	Gold 2004
Rapidan Mound/VA Piedmont	VA-Late Woodland II	22.80%	Gold 2004
North Carolina Inner Coast	Late Prehistoric	17-18%	Hutchinson 2002
North Carolina Outer Coast	Late Prehistoric	17-24%	Hutchinson 2002
North Carolina Ossuary Site	Late Prehistoric	2.8-9.2%	Driscoll and Weaver 2000

Enamel Hypoplasias

One type of paleopathological landmark that can be identified on human dentition is categorized as enamel hypoplasias, which includes enamel deficiencies in various forms such as grooves, pits, and lines. One of the most common forms of deficiency

recorded in the skeletal record of archaeological populations within the Eastern Woodlands prior to European contact is linear grooves (Larsen 2001:182). Referred to in this study as linear enamel hypoplasias (LEH), these markers are considered a nonspecific indicator of physiological stress, which ultimately resulted in the disruption of enamel formation during the process of calcium deposition (Huss-Ashmore, et al. 1980; Blakey and Armelagos 1985; Gold 2004). Data provided through previous research (e.g. Goodman and Armelagos 1985:489; Blakey and Armelagos 1985; also Reeves 2000) have expressed patterns in the points of insult, determining that variations occur in levels of hypoplasticity per tooth type. This hints to the basic premise that the presence of enamel hypoplasias on less hypoplastic teeth (less susceptible to hypoplasia occurrence) is suggestive of a more severe physiological occurrence. The results of the data from this study examine hypoplastic markers at several levels, including occurrence based on age and sex estimations, tooth type, and overall burial frequency.

As previously discussed in this chapter, the primary-single interment burial patterning at Site 44PG51 made it possible to provide a series of analyses at the individual level. This analysis includes an account of LEH frequency per age (adult versus subadult), sex (adults only), and overall frequency patterning (total and per tooth type). The overall occurrence of linear enamel hypoplasias was calculated at 17.83%, which is considerably lower than the calculated LEH frequency of 34.17% for Ossuary 5 of Site 44CC29. When compared using Chi-Squared with a significance level of $P=.05$, the difference for these contemporaneous burial contexts is significant. When examining the Hatch Site at the Intrasite level LEH frequency was more common in females than in males and the average maximum number of LEH per tooth per person was 50% higher

for females than males. These numbers appear to indicate that, on average, females experienced more episodes of physiological insult than males and that more females suffered these episodes than males. From the mindset of the “osteological paradox” (see Gold 2004:101; also Huss-Ashmore, et al. 1980:443) this could also be taken to show that more females survived these episodes than males did. However, the evidence from the carious lesion data does appear to indicate possible differential patterning in adult diet, where the carious lesion frequency for adult males is 48.95% and the frequency for adult females is 18.03%. This suggests that there is the possibility for differences in childhood diet as well, among other potential causes of physiological stress.

For Ossuary 4 at site, the LEH frequency was relatively similar to that of its later counterpart Ossuary 5, calculating to 37.82% (Figure 6.3). The general pattern occurring between these burial populations suggests that while the increased level of horticulture is occurring for the Ossuary 5 burial population, relative to that of Ossuary 4, physiological stressors during childhood do not change much, though there is a slight decrease (based on dental caries rates). Whereas, those physiological insults marked by enamel hypoplasias at the Hatch Site (17.83%), decrease significantly, while demonstrating a marked increase in dental caries from Ossuary 4 and a slight increase from Ossuary 5 . Additionally, there is a variation expressed in LEH frequency distribution based on tooth type, which, based on Goodman and Armelagos’ (1985) study, is generally exhibited in the increased rate on LEH’s for anterior teeth.

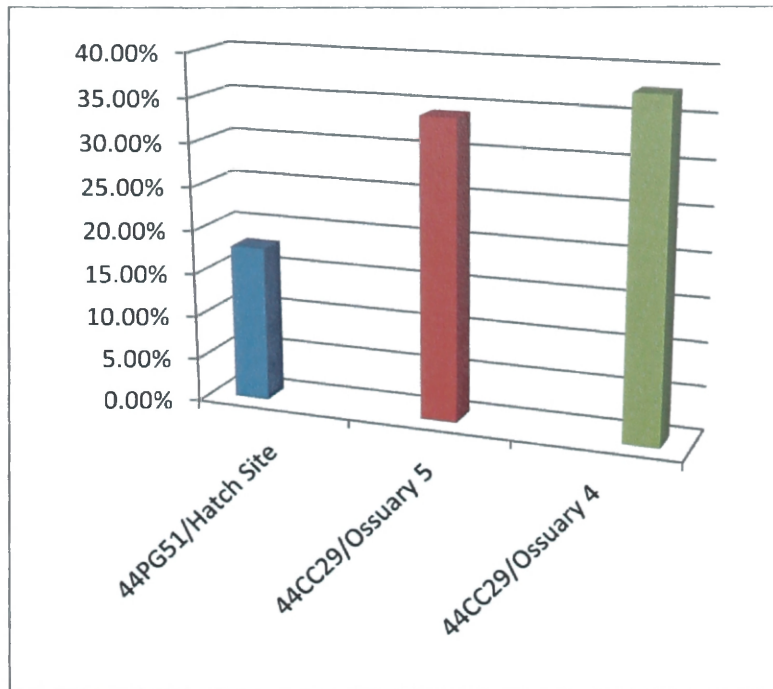


Figure 6.3: Burial Population comparison of enamel hypoplasia frequency.

Goodman and Armelagos' (1985:490-491) study indicates that the anterior teeth, such as central maxillary incisors and mandibular canines are more susceptible to hypoplastic disruptions, but note that "...great variation in susceptibility in growth disruption exists both within and between teeth." The LEH frequency distribution from Hatch follows a similar pattern, where the frequency of incisor LEH's is approximately 45%, which is markedly different the overall frequency of molar hypoplastic events (16.00%). Although there is no statistically significant relationship among the distribution of Ossuary 4 hypoplasias ($P \geq .01$), it is important to note that there is a relatively high frequency of molar hypoplasias (relative to the distribution). While the

presence of physiological insults represented on incisors from Ossuary 5 is similar in frequency to that of Ossuary 4 (~28.00%), there is a decrease in molar based hypoplasias (Figure 6.4). The relatively similar distribution of LEH frequencies among the tooth types in Ossuary could be a result of the underrepresentation of incisors (20.88%; normal distribution=25%) within the dentition materials (discussed in chapter 5). Lastly, the LEH frequency distribution for Ossuary 5 reflects a significantly lower rate when compared to the Hatch Site, which could be explained by the marked underrepresentation of incisors (15.74%) compared to the normal distribution of incisors (25%).

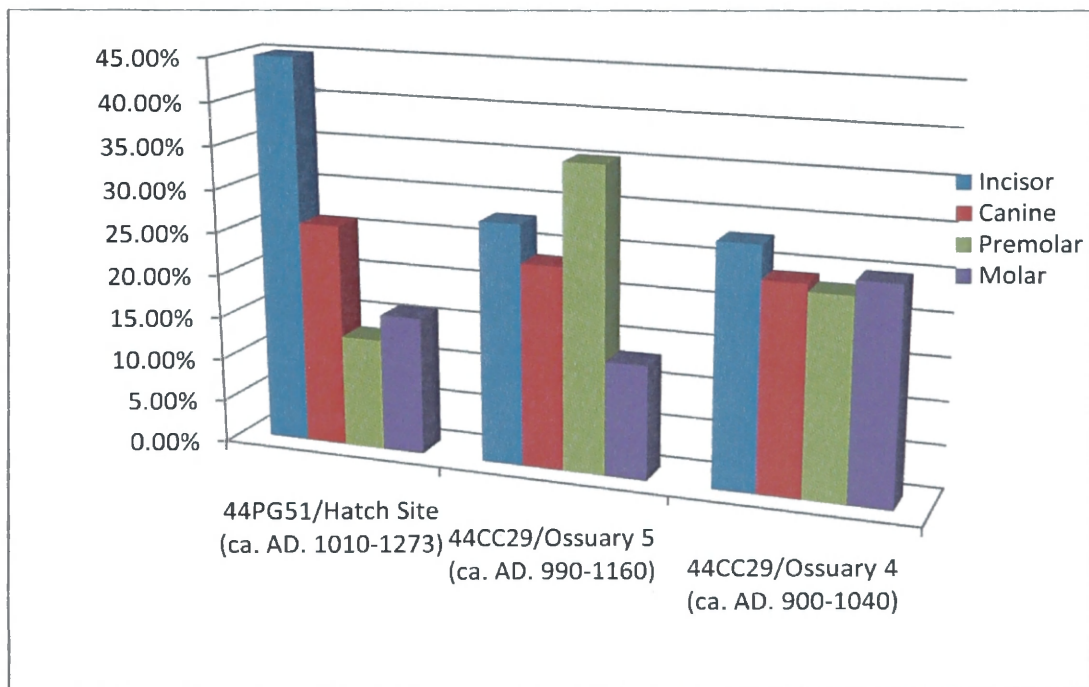


Figure 6.4: Comparison of total number of teeth with Enamel Hypoplasias based on tooth type.

When compared to regional data, the first notable trend from the sites within this study is the difference that exists between the frequency exhibited by the Hatch Site burial population and burial sites within the Piedmont region of Virginia (Gold 2004:100). The burial mound populations are associated with the Virginia Late Woodland period. More specifically, the Lewis Creek burial population (ca. AD. 1000-1160) is contemporaneous with the Hatch Site burial population with an LEH frequency of 39.35%, which reflects a statistically significant difference from the LEH frequency exhibited at the Hatch Site (17.83%). This difference in frequency could indicate the presence of more abundant resource exploitation; however the percentage of physiological stress episodes witnessed in the Ossuary 5 burial feature is twice as high as that from the Hatch Site, resembling the Lewis Creek LEH frequency, with similar frequencies in dental caries rates. Also, data collected from some burial populations within regions south of the Virginia Coastal Plain (ie. North Carolina Coastal Plain) indicate a relative LEH frequency similar to that observed in Ossuary's 4 and 5.

Summary and Discussion

The brief overview of subsistence regimes in the Coastal Plain of Virginia during the Late Woodland period have been characterized as both seasonal and mixed as evidenced through historical accounts and the archaeological record. As indicated above, prior to colonial documentation dietary patterns become represented through the archaeobotanical, archaeological, and more importantly bioarchaeology analyses. While archaeological and other representations contribute a vital component to the reconstruction of past lifeways, a bioarchaeological approach examines past populations through direct indicators of cultural practices and human-nature interactions (Pearsall

2009; also Gremillion 2003). Chemical levels of analysis such as stable isotope analysis provide pertinent data highlighting various components and levels of subsistence practices, which in-turn allow for more complete accounts of health and diet especially when compiled with archaeological data (e.g. Hutchinson 2002; Larsen, et al. 2000). Macroscopic analyses, such as the ones detailed within this study, allow for the reconstruction of the lifeways of past individuals and groups based on visible indicators of biological status (ie. age estimation, sex, health, etc) as well as cultural practices (ie. subsistence practices, gender based differences, etc.).

The comparative data discussed in the previous sections of this chapter utilize models of subsistence and general health as a means to ascertain the types and levels of resource exploitation through an examination of human dentition. Overall, general trends in the data illustrate a temporal trend in the presence of carious lesion frequencies; however, the frequencies for linear enamel hypoplasias are not indicative of temporal relationships among the Hatch and Edgehill Site burial populations. For all burial populations, the dental caries rates are within the levels necessary to suggest the presence of horticultural practices. As previously noted, during the Late Woodland period in the Coastal Plain region cultivation practices based on land use, technique application, and settlement patterning are representative of extensive horticultural communities not agricultural (see Barfield and Barber, 1992:230). Based on regional comparisons, such as those provided by Gold (2004) and Reeves (2000), the caries frequencies for sites 44PG51 and 44CC29 represent populations whose subsistence practices include the cultivation of domesticates to some degree, with the possible presence of maize for the later burial communities. Dent (1995; see also Magoon 2010) discusses the

ecological diversity within the Chesapeake Bay region, which includes the Coastal Plain region of Virginia. The diverse terrestrial and aquatic resources present within this region had the ability to supply a wide array of resources for seasonal exploitation during the Late Woodland period. This is important to note because it lends insight into the lower physiological stress episodes represented through hypoplasias at the Coastal Plain sites in this study when compared to other regions. The combination of the dental analyses and the faunal material data for the Hatch Site and Ossuary 5 of the Edgehill site allows for the speculation of a seasonal trend in subsistence practices as a means to attain dietary requirements (see Gallivan, et al. 2009; also Magoon 2010). Additional attention should be paid to the cold period during the Late Woodland period when the climate underwent a decrease in average temperature (Dent 1995; Fritz 2000; Magoon 2010). This shift in temperature could account for the variation in environmental factors that may have played a role in the variation of levels of LEH frequencies between the Hatch Site burials and the burial population of Ossuary 5; however, further research is needed in order to assess this possibility.

Chapter Seven

Conclusions and Future Research

Conclusions

The primary focus of this study examines the incorporation of horticultural practices within the dietary programs utilized by the communities that the burial populations from the Hatch and Edgehill Sites represent. While secondary questions and hypotheses within this study pertain mainly to trends in dietary practices, dentition are also studied as a means to identify overall health and nutrition through the use of physiological stress markers. The analyses provided in Chapters 4 and 5 examined the frequencies for dental caries and linear enamel hypoplasias of the burial components at the Hatch Site (44PG51) and Ossuaries 4 and 5 from the Edgehill Site (44CC29). As discussed in Chapter 2, Gold's (2004) use of the middle-range society model is utilized within this study in order to provide general settlement context for the aforementioned burial populations. Gallivan (2003) indicates that the Late Woodland II period (ca. AD. 1300-1600) is characterized by increased sedentism, more complex settlement patterning, village organization, etc. Thus, the Late Woodland I period (ca. AD. 900-1300) represents the transitional period where communities were smaller in size and villages were organized in a less complex manner, based on archaeological studies (e.g. Dent 1995; Gallivan 2010; Gold 2004).

The Hatch and Edgehill Site burial populations examined in this study (discussed in Chapters 4 and 5) are situated within the Inner Coastal Plain of Virginia during the Late Woodland I period. The middle-range society model is suited for this study as a

settlement model, given the associated temporal period of the burial contexts as well as archaeological distinctions made about village size and general organization in the Coastal Plain of Virginia during the Late Woodland Period (see Gallivan 2003; also Gold 2004; Potter 1993). The different mortuary programs at the sites allow for a variation in analysis processes. While the single-primary interments at the Hatch Site allow for analyses at the individual level, the ossuaries at the Edgehill site allow for analyses only at the group level in this study due to the comingled nature of the human skeletal materials. In addition, the burial components examined and discussed in this study provide comparable data sets that allow for the dissemination of dietary practices based on the analysis of the dentition. Gold (2004:77) suggests that the use of cultigens is a component of the subsistence practices utilized by middle-range societies and should be reflected in the dental record.

The hypotheses presented for this study assert that the burial populations of the Hatch Site and Ossuaries 4 and 5 (the Edgehill Site) are representative of horticultural based communities, which should be reflected in the data. Also, that because these burial populations span the majority of the Late Woodland I period, an increase in horticultural practices should exist, which is indicated by an increase in the presence of dental caries. The data analyses provided in Chapters 4 and 5 indicate that the carious lesion frequencies for the burial populations are above the 7% threshold, which separates hunter-gatherer societies from horticultural/agricultural societies (Larsen, 1997:68). This evidence supports the hypothesis that the communities represented by these burial components were incorporating horticultural practices in their subsistence regimes. While the skeletal materials from Ossuary 4 (ca. AD. 900-1040) have a carious lesion

frequency of 11.36% (slight increase from the 7% threshold), Ossuary 5 (ca. AD. 990-1160) and the Hatch Site (ca. AD. 1010-1273) have frequencies of 18.88% and 22.16% respectively. This reflects a continual increase in carious lesion frequency from the earliest to the latest dated burial populations.

While the difference between the frequencies for the Hatch Site and Ossuary 5, which are relatively contemporaneous, is not statistically significant, the difference between the frequency for Ossuary 4 and the frequencies for Ossuary 5 and the Hatch Site is statistically significant. The hypothesis that there should be an increase in horticultural practices as communities within the Inner Coastal Plain progress through the Late Woodland I period, is supported by an increase in carious lesion frequencies for the burial components based on temporal range. As discussed in Chapter 4, a slight increase in carious lesions beyond the 7% threshold for horticultural/agricultural societies is indicative of the use of native weedy cultigens, whereas a significant increase is indicative of maize use as a dietary component. However, chemical dental analyses provided by Hutchinson (2002) indicate that it is possible for maize to be present even when carious lesion frequencies are not significantly higher than this threshold.

This suggests that Ossuary 4 represents a family or community whose subsistence practices included the use of native domesticates as a component of their dietary routine. The marked increase in carious lesion frequencies for the Hatch Site and Ossuary 5 reflects the incorporation of maize within the horticultural practices, although it does not indicate that maize was the primary component. Comparisons made among Ossuary 5, the Hatch Site, and the Virginia Piedmont burial mound (Gold 2004) support this reflection, where frequencies from the Late Woodland I burial mound populations (20-

25%) are similar to those for the Hatch Site and Ossuary 5. Also, the carious lesion frequencies for the Virginia burial mounds are accompanied by stable isotope analysis data, providing a base for the previously mentioned reflection.

The prevalence of linear enamel hypoplasias (LEH) follows a trend opposite of the one illustrated by carious lesion frequency, where dental caries increased over time. Although the difference in LEH frequency exhibited by Ossuaries 4 and 5 is not statistically significant, the overall pattern illustrates a decrease in frequencies among the burial components utilized in this study. Additionally, the difference in LEH frequencies between the Hatch Site (17.83%) and Ossuaries 4 (37.82%) and 5 (34.17%) is statistically significant.

As a general indicator of physiological stress, the higher frequencies for the Edgehill Site ossuaries indicate that the burial population had a greater prevalence of childhood stressors. The pattern could reflect an improvement in health over time, based on overall decrease in LEH's; however, the marked decrease in the LEH frequency for the Hatch Site is significantly lower than other recorded LEH frequencies during the Late Woodland period. Gold (2004:127) indicates that the higher frequency of LEH's could be representative of greater childhood survivability because "enamel hypoplasias only appear if an individual survives a childhood stress episode." If this line of interpretation is adhered to, it would indicate that the Hatch Site burial population represents a population with a high childhood mortality rate. However, if Ossuary 5 and the Hatch Site are contemporaneous shouldn't the data reflect similar patterns? Further investigation is needed for the assessment of this patterning as well as to identify potential relationships between other data collected for the dentition.

Future Research

While this study provides a preliminary analysis on the subsistence patterns within the Coastal Plain region of Virginia during the Late Woodland period, further analyses are needed for a more complete reconstruction of dietary practices during this time. The paleopathological landmarks analyzed in the previous chapters illustrate the significance in bioarchaeological analyses through comparisons of macrolevel data. However, recent studies by Schoeninger (2009) and Rose (2008) demonstrate the importance of the incorporation of chemical analyses such as stable isotope analysis. These analyses utilize the culmination of isotope data, bioarchaeological data, and archaeological data to provide more adequate reconstructions of subsistence practices as well as cultural patterns and social organizations. Research conducted by Driscoll and Weaver (2000) and Gold (2004) combine macrolevel data with chemical data to lend further insight into cultural regimes during the Late Woodland period.

The incorporation of multiple levels of study (ie. an interdisciplinary approach) is the direction that this study has provided a base for. Currently, stable isotopes analyses are being conducted on dentition from the Edgehill Site with the consent of the Chickahominy Tribe. Discussions involving chemical analyses of the materials from the Hatch Site are part of the next step for assessing future research potential. However, chemical analyses will not be conducted unless consent is given. Studies such as Gallivan and McKnight (2008) involve the dating of archaeobotanical remains, which lend insight to the cultigens present in Virginia during the Late Woodland period. This type of research will shed light on the introduction and use of domesticated plants such as

maize that did not originate in this region, but overtime were increasingly incorporated in various cultural practices. The knowledge regarding the Native people of Late Woodland coastal Virginia is limited, which requires the combination of several lines of evidence for an adequate reconstruction of subsistence practices. This will also potentially allow for the opportunity to reconstruct links between those practices and other cultural and social phenomenon, such as political development, village organization, hierarchical social structures, etc.

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