MALABAR PERIOD FAUNAL USE AT TWO LOCATIONS

IN THE FOX LAKE SANCTUARY,

BREVARD COUNTY, FLORIDA

by

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ABSTRACT

This research describes two Malabar II Period sites (AD 750 – 1565): Hunter's Camp (8Br2508) and Palm Hammock (8Br2509) which were excavated in the Fox Lake Sanctuary in Brevard County, Florida. Faunal assemblages recovered from general excavation units and features were examined to learn more about Malabar Period subsistence. Sampling methods utilized at the site allowed for a more complete understanding of subsistence strategies. The main objectives of this study are to determine the seasonality of the sites and to compare the subsistence strategies between the two sites by determining species diversity, the relative abundance of marine versus freshwater species, and aquatic versus terrestrial species. The data collected suggests a winter and summer occupation of the Hunter's Camp and Palm Hammock sites. In addition, the data collected indicates that the occupants living at these sites incorporated turtle, marine fish, freshwater fish, and shellfish into their subsistence economy, almost to the exclusion of all other species.

DEDICATION

This thesis is in memory of my grandmother who just recently lost her long battle with Alzheimer's.

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

> "What remains to be done is to define more clearly the growth and development of human adaptations to the natural environments of the state and the ways in which people have adapted the varied resources to their own use" (Milanich and Fairbanks 1980:13).

This master's thesis project aims to contribute substantial information about the paleoenvironment and the faunal resource use of the ancient inhabitants of east-central Florida, namely the area around the Fox Lake Sanctuary in Titusville, Brevard County, Florida. This project will focus primarily on the Malabar II period, which occurred from AD 750 – 1565. However, archaeological evidence suggests that occupation of the area spans from the Archaic Period (7500 – 1000 BC) to the more recent Malabar Period, which is divided into two parts: Malabar I (1000 BC – AD 750) and Malabar II (AD 750 – 1565).

The faunal sample for this project comes from two sites located in the Fox Lake Sanctuary, Hunter's Camp (8Br2508) and Palm Hammock (8Br2509). Faunal material from general excavation units, column samples, and shovel tests provide an inventory of the animals utilized by the people of east-central Florida in what is now the Fox Lake Sanctuary. This inventory also will provide insight into the seasonality and species diversity of the sites (Figure 1.1).

Both Hunter's Camp and Palm Hammock were excavated by the Indian River Anthropological Society from 2010 – 2012 (Penders, personal communication 2012). These sites are located in the Fox Lake Sanctuary near Titusville, Florida. Wildlife management areas surround the Fox Lake Sanctuary on the north, west, and south, and the city of Titusville borders Fox Lake Sanctuary on the east (Penders 2009). The Hunter's Camp site is located on a relict dune ridge that is adjacent to a tributary of South Lake (Thomas Penders, personal communication 2010). The Palm Hammock site is located approximately a half mile to the northeast of Hunter's Camp also along a tributary of South Lake (Figure 1.2).

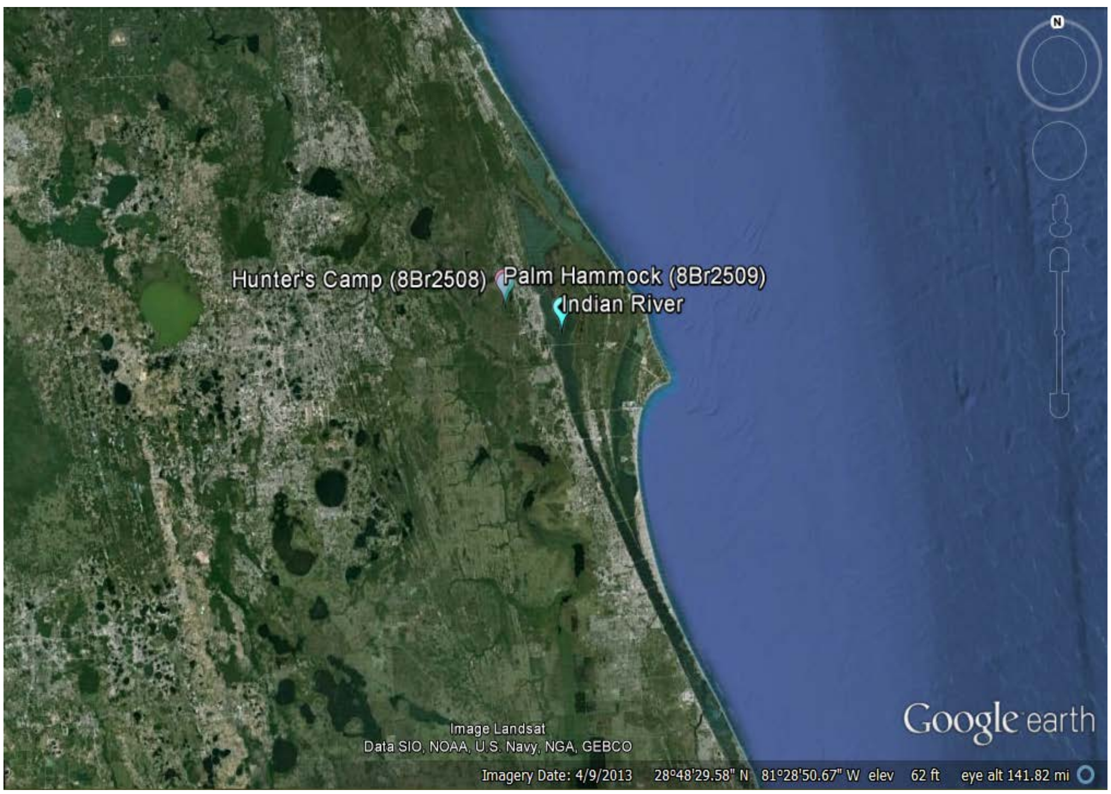

Figure 1.1: Overview of the locations of Hunter's Camp and Palm Hammock

Figure 1.2: Map showing the location of Hunter's Camp (8Br2508) and Palm Hammock (8Br2509)

The first objective of the below presented research and analysis was to gain a better understanding of the overall subsistence patterns and the fauna present in the paleoenvironment of the two above discussed Malabar sites. In order to do this, I determined the taxa utilized, and whether certain groups of animals were exploited more than others. The second objective of this project was to determine whether these sites were seasonally occupied. This was accomplished by identifying avian species that only occur in this area of Florida during the winter. The final objective of the project was to determine whether the Hunter's Camp or the Palm Hammock sites were occupational sites or satellite-processing sites. This final objective was accomplished by comparing Hunter's Camp and Palm Hammock to other contemporaneous sites to the north, south, and west, which were utilized as processing sites. Answering these questions will provide a better understanding of the subsistence patterns of Malabar people and the paleoenvironment of these sites. Due to the lack of archaeological research in the area, the information obtained from the analyses of these sites will provide important insight into a poorly understood population of people who once occupied the Fox Lake Sanctuary area. The fauna the Malabar people used at these sites does not definitively indicate the people occupied the site year-round, but the presence of seasonal taxa, namely wintering birds and reptiles, indicates summer and winter occupations.

Archaeological Overview of the Region

The Florida specific Malabar Period began at the end of the Late Archaic (3000 BP) and lasted until the arrival of the Spanish in 1565 (Milanich 1994). The Malabar Period coincides with the St. Johns Period, another Florida specific cultural period (Milanich 1994). The St. Johns culture region is located in eastern and central Florida, and it is composed of the northern and central portions of the St. Johns River, its tributaries, and portions of the coastal barrier island,

and the lakes of central Florida (Milanich 1994). According to Milanich (1994:248), the St. Johns region is “not a single, homogenous culture area.” It is comprised of two different regional variations, the St. Marys and the Indian River (Milanich 1994). The St. Marys region is located in northeastern Florida near what is present-day Georgia. The Indian River cultural region is located in southeastern Florida at the southernmost area of the St. Johns Region (Milanich 1994). The Indian River cultural area of the St. Johns Period is where the Malabar Period sites are located (Figure 1.3).

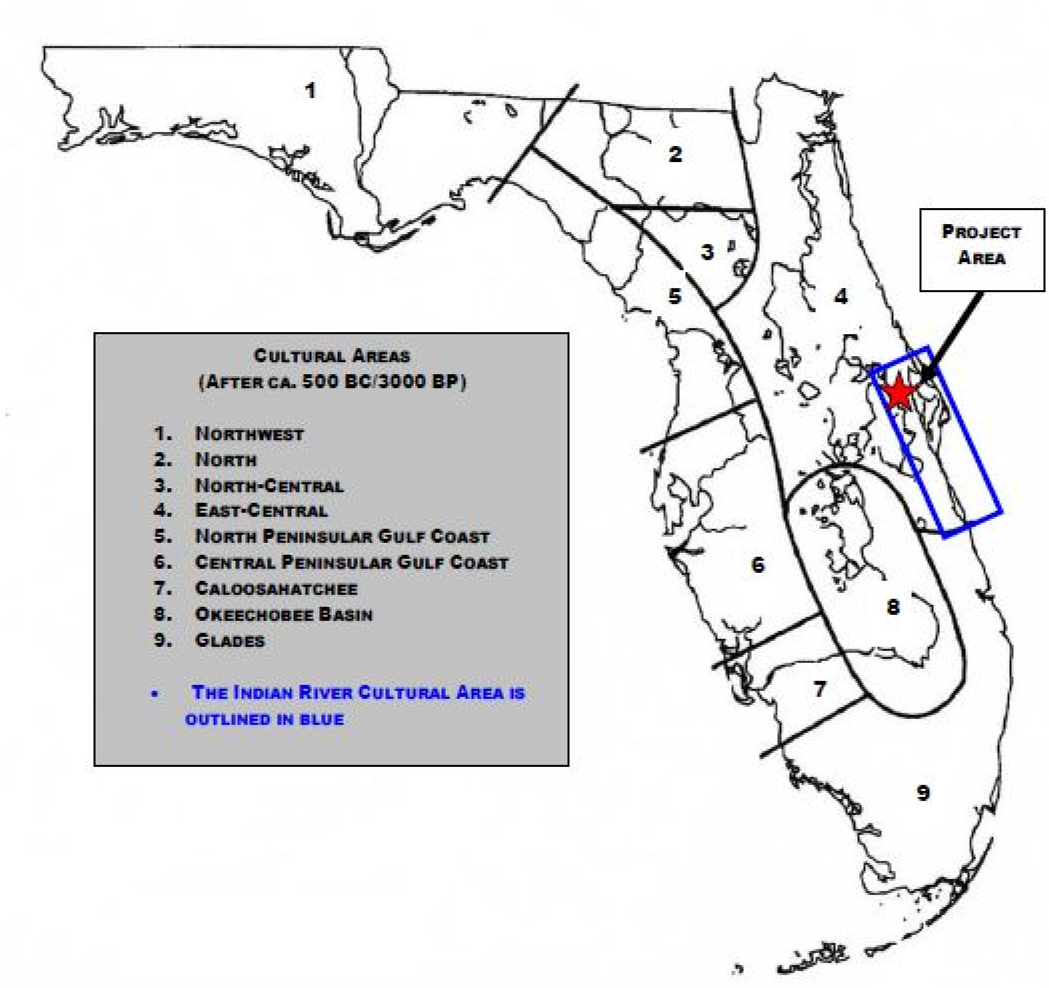

Figure 1.3: Florida Culture Areas; Indian River is outlined in blue (Penders 2009)

The types of ceramics recovered by Clarence B. Moore from sites in this area of Florida were used to establish cultural chronologies that characterize the St. Johns Period. The St. Johns I Period, known for its pottery, has a chalky texture/appearance and is often decorated with incisions, while the St. Johns II Period pottery is decorated with check-stamping, a technique that involved pressing a carved wooden paddle into the wet clay (Milanich 1994).

Irving Rouse was one of the first archaeologists to characterize the pre-Columbian cultures of the St. Johns region, which included the Indian River culture area, a coastal lagoon near Merritt Island, and the St. Lucie Inlet (Rouse 1951; Milanich 1994). Rouse stated that the Indian River sites, including the Fox Lake sites, were significantly different from the surrounding areas (Rouse 1951). Rouse relied heavily on the work of his contemporary, John M. Goggin, in that Goggin believed the Indian River culture was a transitional culture between the Northern St. John's and the Glades-Kissimmee areas (Goggin 1949; Rouse 1951) (Table 1.1).

Table 1.1: Prehistoric Cultural Periods of East Central Florida, including the Indian River of the St. Johns Region (Griffin 1945; Goggin 1949; Rouse 1951; Milanich 1994)

Date (Years Before Present)	**Cultural Period (Indian River)**	**Cultural Period (St. Johns)**	**Cultural Period (St. Marys)**
9,500 4,000	Early Archaic Orange	Early Archaic Orange	Early Archaic Orange
3,000 1,000	Malabar I Malabar II	St. Johns I St. Johns II	St. Johns I St. Johns II

Another contemporary of Rouse, James B. Griffin, set up four distinctive cultural periods based on pottery types (Griffin 1945; Rouse 1951). These period and pottery types are as follows: Preceramic, Orange Incised (a fiber-tempered ware), St. Johns Plain (a chalky ware without stamping), and St. Johns Check Stamped (a chalky ware but with check-stamping)

(Griffin 1945; Rouse 1951). Goggin proposed the period names while still keeping Griffin's pottery-type definitions, and these included Non-ceramic, Orange, St. Johns I, and St. Johns II (Goggin 1947; Rouse 1951). In 1948, Goggin created a revised version of the first list, and these included: 1) Preceramic, 2) Orange, 3) Malabar I, 4) Malabar IIA, 5) Malabar IIB, 6) St. Augustine, and 7) Seminole (Goggin 1948; Rouse 1951). Goggin distinguished Malabar IIA and IIB by the presence of European trade goods in Native American artifact assemblages (Goggin 1948; Rouse 1951). Rouse categorized the Indian River region using the revised list, specifically the Malabar periods (Rouse 1951; Milanich 1994). Rouse's Malabar I Period occurred at the same time as the St. Johns I Period and the appearance of St. Johns Check Stamped pottery characterizes the Malabar II Period (Milanich 1994).

When compared to contemporary periods of the southeast, the Malabar Period is characterized by "an absence of corn agriculture, and differences in language, religion, and social organization" (Penders 2009:15). Milanich (1994) notes that during the Malabar I Period, wetter conditions were beginning to prevail and water levels of the local rivers were rising. In middens found at Malabar sites, archaeologists have noted an abundance of larger fish and a higher overall species diversity (Milanich 1994). The expansion of the wetlands extended into the Malabar II Period. The deeper waters resulted in an increase of deep-water fish such as bass (*Micropterus* sp.) and pickerel (*Esox americanus americanus)* (Milanich 1994). However, the wetlands would dry up during periods of lesser rainfall and during the winter and spring. During these drying periods, the amount of deep-water fish would decrease (Milanich 1994). In the Malabar midden areas, bowfin (*Amia calva)* and gar (*Lepisosteus* sp.) became abundant in this area due to their ability to survive in shallow, muddy waters (Milanich 1994). According to Michael Russo, as cited in Milanich (1994), Malabar II people also utilized large amounts of turtle, which were vulnerable to harvesting as they relocated due to lower water levels in the dry season. Terrestrial animals, such as deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), and rabbit (*Sylvilagus* sp.), also were used as food, but only accounted for nearly 15 percent of Malabar I components and 14 percent of Malabar II components. In contrast, reptiles and fish comprised nearly 80 percent of the diet for both Malabar periods (Milanich 1994).

In the east-central area of Florida, the Hunter's Camp and Palm Hammock Sites are located near two rivers, the freshwater St. John's River and the brackish Indian River. The National Oceanic and Atmospheric Administration (NOAA) defines brackish water as "the mixture of seawater and freshwater, and its salinity can range from 0.5 to 35 parts per thousand (ppt). The salinity varies and can change from one day to the next depending on the tides, weather, or other factors" (National Oceanic and Atmospheric Administration 2008). During the Malabar period, the terrestrial and freshwater zones around these areas would likely be the source of the faunal resources utilized as a means of subsistence (Doran 2002).

Until professional excavations by Thomas Penders in 2010, there had been no investigations at the Fox Lake area (Thomas Penders, personal communication 2010). Upon receiving permission of the Environmentally Endangered Land (EEL) Program, Penders, and the Indian River Anthropological Society (IRAS), began a multi-year survey of the Fox Lake Sanctuary, which included the Hunter's Camp and Palm Hammock sites. Test areas of the sanctuary were defined from a survey that Penders completed in 2009 which showed a high archaeological potential (Thomas Penders, personal communication 2011). This area was selected for two main reasons: 1) the persistent rumors from people living in the area of an "Indian mound" at the location and 2) its location on a high, well-drained sandy soil relict dune ridge on the south side of South Lake. These types of conditions are conducive to preserving prehistoric sites and considered high areas of archaeological potential (Thomas Penders, personal communication 2011). In this context, “Indian mound” is a local colloquialism that refers to a raised area of soil located at Hunter’s Camp. Archaeological investigations of this raised area by Penders suggest that the “mound” is likely a shell midden or refuse pit rather than a purposefully constructed earthen mound.

CHAPTER 2

METHODS

Sampling and Field Methods

Hunter’s Camp was identified as an archaeological site after 126 shovel tests had been completed in the area. These shovel tests were conducted at 10 meter (m) intervals, and they measured 50 x 50 centimeters (cm) (Thomas Penders, personal communication 2011). The shovel tests were excavated to a minimal depth of 100 cm with an average depth of 105 cm (Thomas Penders, personal communication 2011). In addition, four 2 m X 2 m units were excavated on site in 10 cm levels (Thomas Penders, personal communication 2010). Test Unit A was near the southern boundary of the site. Test Unit B was in the middle of the site. Test Unit D was adjacent to B on the east and Test Unit C was adjacent on the west (Thomas Penders, personal communication 2010). All excavated soil was screened through 1/4-inch hardware mesh. The soil from any feature was screened through 1/8-inch mesh (Thomas Penders, personal communication 2010). The faunal assemblage from Hunter’s Camp was recovered during the excavation of the test units. All artifacts were recovered from the subsoil stratum of the test units.

Palm Hammock was identified as a site after 58 shovel tests had been completed. These shovel tests were conducted at 10 m intervals and measured 25 x 25 centimeters cm (Thomas Penders, personal communication 2012; Peacock 2000). The shovel tests were excavated to a maximum depth of 130 cm. Also excavated were four 1 m x 2 m units, which were removed in 10 cm intervals (Thomas Penders, personal communication 2012). In addition, five column samples were excavated vertically into the wall profile from each of the test units. Five test units, labelled A-E were then excavated. All of the soil was screened through 1/4-inch hardware mesh, and soil from any feature was screened through 1/8-inch mesh (Thomas Penders, personal communication 2012). Artifacts, including pottery, botanicals, lithics, and faunal materials were recovered from the subsoil stratum of the shovel tests and excavation units from Palm Hammock.

Zooarchaeological Methods

The faunal assemblage was sorted and identified using the methods outlined in Reitz and Wing (2008). Many of the identifications utilized the Zooarchaeology Comparative Collection housed in the Department of Sociology and Anthropology at Middle Tennessee State University, the Zooarchaeology Comparative Collection at the Florida Museum of Natural History in Gainesville, Florida, and the Zooarchaeology Comparative Collection at the University of Alabama at Birmingham. The aforementioned comparative collections included common mammal species, freshwater and marine turtles, birds, freshwater and marine fishes, snakes, and invertebrates, including bivalves and gastropods. Materials were packed and sent via the United States Postal Service and then stored at the University of Alabama in Birmingham. Analyses were conducted in the archaeology lab at the University of Alabama at Birmingham.

All identifications were made to the most precise taxonomic level, which in many cases, was genus and species. All modifications to the faunal material were recorded, including butchery marks, marks related to tool or ornament manufacture, heat alterations, or unidentified probable modifications. Primary data, such as the number of identified specimens (NISP), were recorded into Microsoft Excel© datasheets. Secondary data, such as minimum number of individuals (MNI), were calculated using methods described by Reitz and Wing (2008).

Other secondary data, including seasonality and species diversity and equitability also were assessed. Assessing the seasonality of these sites, involved identifying elements from species typically found in this area of Florida during certain seasons, i.e. duck species that winter in Florida. This method gives insight into when these species were harvested, thus providing an idea of when the sites were occupied. In addition, the evaluation of species diversity and equitability is derived from calculations utilizing the Shannon-Weaver index (Shannon and Weaver 1949). This assessment allows a determination if certain species are being utilized more than others.

Species diversity and equitability of a site can give an overview of the overall richness of an ecosystem and what people were selecting from that ecosystem (Reitz and Wing 2008). The species diversity is the different number of species that are present within a site. The diversity of a site is often related in a general way to the climate (Reitz and Wing 2008). For example, an environment associated with a high diversity could have warm temperatures and lots of moisture, and will often be associated with high terrestrial activity (Reitz and Wing 2008). However, it is important to note that there are exceptions to such assessments. For example, salt marshes often have a high productivity but low species diversity. This is likely due the lower complexity of vegetation found in a salt marsh (Reitz and Wing 2008). For the purposes of this study, the diversity of a site is determined utilizing the Shannon-Weaver Index, also referred to as the Shannon-Wiener function (Shannon and Weaver 1949; Reitz and Wing 2008). According to Reitz and Wing (2008:111), diversity "reflects the amount of uncertainty in predicting the identity of an individual picked at random from the community, that is, the heterogeneity of the sample." The diversity index (H') is calculated utilizing the following equation:

$$H' = -\sum_{i=1}^{s} p_i \ln p_i$$

In the above equation, H' equals the information content of the sample, and p_i equals the relative abundance of the *i*th taxon within the sample, Log p_i equals the logarithm of p_i (this can be base $_{2}$, $_{e}$, or $_{10}$ (Reitz and Wing 2008). S in the above equation equals the number of taxonomic categories. A relatively diverse distribution of taxa will have a diversity index (H') that is also close to 1.0 (Reitz and Wing 2008).

In order to measure heterogeneity, a combination of two independent concepts is utilized, and these concepts include species richness (the number of species) and equitability (the degree to which species are equally abundant) (Reitz and Wing 2008). In order to calculate the equitability of fauna at a site, the heterogeneity measure is scaled to the theoretical maximum (Reitz and Wing 2008). The equitability is calculated utilizing the following equation:

$$V' = H' / \text{Log}_e S$$

In the above equation, H' equals the Shannon-Weaver function and S equals the number of species in a community (Reitz and Wing 2008). An equitability (V') close to 1.0 indicates an even distribution of taxa, and values lower than 1.0 indicates a dominance of one or a few taxa (Reitz and Wing 2008).

In addition to the above calculations of species diversity and equitability, comparisons were also made using chi-square tests. These calculations were made in order to determine correlations between the fauna and the aquatic environments of the two sites. By performing this test, I am attempting to demonstrate a relationship between the two sites (Shennan 2001).

Calculations were made from the following analyses: aquatic vs. terrestrial taxa, taxa from aquatic environments (i.e. freshwater, brackish, and marine), turtle taxa vs. all other vertebrate taxa, and mammals vs. all other vertebrate taxa.

Other sites in Florida located to the north, south, and west of Hunter's Camp and Palm Hammock also were examined due to their distinctions as possible special use sites. The majority of the faunal assemblages from these sites were often comprised of a single species, including oyster, clam, tagelus (a marine bivalve), and small fish. These comparisons were made to determine if Hunter's Camp and/or Palm Hammock could be classified as special use sites. In order to make this comparison, I examined the reports of the fauna excavated from Gauthier (8Br193), Dead Bird Island (8Br247), Edgewater Landing (8Vo115B), Castle Windy (8Vo00112), Zaremba (8Ir56), and Twin Mounds (8Or459) and then compared that fauna to the Hunter's Camp and Palm Hammock assemblages. Finally, I then determined if there were any correlations between my assemblages and the assemblages from these sites.

In addition to the above, animals identified to class, such as Mammalia, also were given the distinction of small, small-medium, medium, medium-large, and large. These distinctions were made utilizing the fauna present in the area, and classifying them by size and weight. Small mammals refer to small rodents, such as squirrels, mice, and rats, and moles. Medium mammals include the bobcat, domestic dog, coyote, opossum, raccoon, red fox, grey fox, North American river otter, and rabbit. Large mammals include black bear, deer, panther, wolf, and though they were not identified at these sites, domestic animals including cow, pig, and horse. The categories, small-medium mammals and medium-large mammals, take into account individual variation among species, meaning a bone fragment too small to be identified to genus and/or species could belong to either a small or medium mammal or a medium or large mammal depending on the size of the fragment.

Field Specimens

The faunal assemblage from Hunter's Camp is comprised of 42 different field specimens (FS), which were excavated from all four test units. The field specimen numbers were assigned per level, such that each new level received a new FS number. The assemblage also contained faunal remains from four features, including B-5, C-4, D-1, and D-7. These numbers indicate the number of the feature located within the subsequent test unit. Radiocarbon samples also were extracted from three features (A1, B5, and D1) providing occupational dates of AD 782 – 1146 (Table 2.1). Samples were taken at three depths from the features ranging from 20-67 centimeters below datum (cmdb). Feature A1 was not discussed in this thesis as faunal remains were not excavated from this feature. There were 15 field specimen numbers that did not have an associated test unit, level, or feature. There was only one field specimen that was associated with test unit A while ten field specimen numbers were associated with test unit B. There were seven field specimens associated with test unit C, and test unit D had nine field specimens (Table 2.2).

Features D-1 and D-7 were excavated from test unit D, with the exception of the west half of Feature D-7 which was excavated from test unit B. The field specimens without an associated test unit often contained only 3-5 fragmented elements, and these often were identified to the lowest taxon in the field; however field specimen 24 did not follow this pattern, containing 30 fragments. Field technicians at the Hunter's Camp site identified many of these elements to Family or Class, and they were then identified to Genus and/or Species in the lab as a part of the current thesis.

Table 2.1: Radiocarbon Dates from Hunter's Camp (8Br2508), Brevard County, Florida[1,]

Sample No.	UGAMS #	Material	Location	Measured C14 Age (BP)	C13/C12 Ratio	Calibrated 2 Sigma (AD)
BR2508-A1-SS18	9314ch	Charcoal	Feature A-1, W1/2 39-61 cmbd	1150+/-20	-25.7	782- 789 809- 849 853- 905 912- 970
BR2508-B5-SS17	9315ch	Charcoal	Feature B-5, S 1/2, 20-40 cmbs	1000 +/- 20	-26.0	989-1044 1099-1119 1142-1146
BR2508-D1-SS9	9316ch	Charcoal	Feature D-1, W1/2, 30-67 cmbd	1150 +/- 20	-25.8	782- 789 809- 849 853- 905 912- 970

[1]Radiocarbon Assays from the University of Georgia

[2]Dates provided by Thomas Penders (Thomas Penders, personal communication 2012)

Recovery of the Palm Hammock faunal assemblage occurred during two field seasons, a Phase I excavation in 2011 and a Phase III excavation in 2012. Fauna from the shovel tests taken in the Phase I excavations was examined and identified to the lowest taxonomic level in the field. In addition, fauna from the Phase III excavations, which included the test units A-D and the column samples, were also identified to the lowest taxonomic level.

Table 2.2: Test units with associated field specimens; Hunter's Camp (8Br2508), Brevard County, Florida

Test Unit A	Test Unit B	Test Unit C	Test Unit D	FS's not Associated with Test Units
58	54	67	71	10
	62	69	72	14
	63	76	81	19
	64	77	82	20
	66	78	87	21
	112	105	88	22
	113	121	91	24
	114		92	45
	127			30
				31
				34
				59
				84
				119

The faunal assemblage from Palm Hammock is comprised of 39 different field specimens, which were excavated from four excavation units, as well as shovel tests and column samples. There was only one feature (C2) present with faunal remains in the Palm Hammock assemblage. There were two field specimen numbers and eight soil samples associated with Test Unit A. Three field specimen numbers and nine soil samples were associated with Test Unit B. There were seven field specimen numbers and ten soil samples associated with Test Unit C; and four field specimen numbers and four soil samples were associated with Test Unit D. Test Unit E was comprised of the four column samples. Eighteen field specimen numbers were associated with the shovel tests (Table 2.3).

Table 2.3: Test units with associated field specimens; Palm Hammock (8Br2509), Brevard County, Florida

Test Unit A	Test Unit B	Test Unit C	Test Unit D	FS's Associated with Shovel Tests	Soil Sample – Test Unit A	Soil Sample – Test Unit B	Soil Sample – Test Unit C	Soil Sample – Test Unit D
369	346	217	351	132	212	192	181	164
377	375	359	353	133	213	193	182	165
	383	360	365	134	215	194	182	166
		361	371	135		195	184	168
		362		136		196	185	
		364		144		197	186	
		373		145		198	187	
				148		199	189	
				149		200	190	
				150				
				151				
				152				
				153				
				155				
				156				
				158				
				161				
				162				

CHAPTER 3

THE RESULTS

Hunter's Camp

The total faunal assemblage from Hunter's Camp is comprised of 22,432 elements and fragments that weigh 6,495.2 grams (g) (Table 3.1). The majority of the weight came from the following taxa: turtles (Testudines) (791.92g), gastropods (Gastropoda) (163.94g), Florida crown conch (*Melongena corona*) (602.31g) and bivalves (Bivalvia) (3851.54g). The total MNI for this assemblage is 420 with the vast majority of that coming from the Florida crown conch (Table 4). Of the 22,438 elements and fragments, 1,227 exhibit evidence of heat alteration. Heat altered elements will appear darkened or, if they have been exposed to a high heat for a length of time, they will appear calcined (white or blue in appearance). However, despite the high overall NISP, only 30 elements and fragments exhibited evidence of modification.

Table 3.1: Analyzed faunal assemblage; Hunter's Camp (8Br2508), Brevard County, Florida

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Vertebrata	Vertebrates	358	0.02	0	0.00	87.66	1.36
Mammalia	Mammals	98	0.44	0	0.00	48.16	0.75
Mammalia, sm	Small Mammals	12	0.05	0	0.00	2.14	0.03
Mammalia, sm-med	Small - Medium Mammals	2	0.01	0	0.00	0.6	0.01
Mammalia, med	Medium Mammals	3	0.01	0	0.00	5.97	0.09
Mammalia, lg	Large Mammals	19	0.08	0	0.00	23.14	0.36
Didelphis virginiana	Virginia opossum	6	0.03	1	0.24	3.55	0.06
c.f. *Didelphis virginiana*	Virginia opossum, c.f.	1	0.00	1	0.24	2.17	0.03
Sylvilagus sp.	Rabbits	13	0.06	2	0.48	7.38	0.11
Sylvilagus floridanus	Cottontail rabbits	5	0.02	2	0.48	1.73	0.03
Rodentia	Rodents	11	0.05	0	0.00	1.82	0.03
Sciurus sp.	Squirrels	1	0.00	1	0.24	0.06	0.00
Sciurus carolinensis	Eastern gray squirrel	2	0.01	1	0.24	0.34	0.01
Neotoma floridana	Eastern wood rat	2	0.01	1	0.24	0.24	0.00
c.f. *Urocyon cinereoargenteus*	Gray fox	1	0.00	1	0.24	1.11	0.02
Procyon lotor	Raccoon	5	0.02	1	0.24	10.51	0.16
Lontra canadensis	Northern River Otter	1	0.00	1	0.24	5.27	0.08
Lynx rufus	Bobcat	3	0.01	1	0.24	4.8	0.07
Odocoileus virginianus	White-tailed deer	23	0.10	2	0.48	60.34	0.94
Aves	Birds	33	0.15	0	0.00	8.03	0.12
Aves, sm	Small birds	1	0.00	1	0.24	0.02	0.00
Aves, med	Medium Birds	1	0.00	0	0.00	0.26	0.00
Aves, lg.	Large Birds	1	0.00	0	0.00	0.97	0.02
Aythya valisineria	Canvasback	6	0.03	1	0.24	3.17	0.05

Table 3.1: cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Podilymbus podiceps	Pied-billed grebe	1	0.00	1	0.24	0.69	0.01
Reptilia	Reptiles	1	0.00	0	0.00	0.84	0.01
Testudines	Turtles	3238	14.43	0	0.00	791.92	12.28
Chelydra serpentina	Common snapping turtle	7	0.03	1	0.24	8.84	0.14
Macroclemys temminckii	Alligator Snapping Turtle	3	0.01	2	0.48	5.61	0.09
Caretta caretta	Loggerhead Sea Turtle	1	0.00	1	0.24	2.23	0.03
Kinosternidae	Mud/musk turtles	100	0.45	13	3.10	26.5	0.41
Kinosternon sp.	Mud Turtles	35	0.16	14	3.33	9.7	0.15
Kinosternon baurii	Striped Mud Turtle	8	0.04	3	0.71	2.12	0.03
Kinosternon subrubrum	Eastern Mud Turtle	12	0.05	2	0.48	3.93	0.06
Sternotherus sp.	Musk Turtle	11	0.05	1	0.24	4.45	0.07
Sternotherus odoratus	Stinkpot	66	0.29	8	1.90	15.98	0.25
Emydidae	Pond or Marsh Turtles	35	0.16	0	0.00	30.77	0.48
Chrysemys sp.	Painted Turtles	9	0.04	2	0.48	4.58	0.07
Deirochelys reticularia	Chicken Turtle	13	0.06	1	0.24	14.81	0.23
Malaclemys terrapin	Diamondback terrapin	23	0.10	4	0.95	25.25	0.39
Pseudemys nelsoni	Florida red-bellied cooter	9	0.04	1	0.24	18.16	0.28
Trachemys scripta	Pond Slider	1	0.00	1	0.24	0.47	0.01
Terrapene carolina	Eastern box turtle	92	0.41	4	0.95	38.58	0.60
Gopherus polyphemus	Gopher tortoise	24	0.11	2	0.48	77.12	1.20
Apalone ferox	Florida soft-shelled turtle	157	0.70	2	0.48	150.89	2.34

Table 3.1: cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Serpentes	Snakes	104	0.46	0	0.00	16.42	0.25
Viperidae	Pit vipers	6	0.03	0	0.00	2.31	0.04
Agkistrodon piscivorus	Water moccasin	4	0.02	1	0.24	3.18	0.05
Crotalus adamanteus	Eastern diamondback rattlesnake	20	0.09	1	0.24	11.07	0.17
Colubridae	Colubrid Snakes	3	0.01	0	0.00	0.26	0.00
Coluber *constrictor*	Racer	2	0.01	1	0.24	0.63	0.01
Elaphe guttata	Corn snake	1	0.00	1	0.24	0.33	0.01
Lampropeltis getula	Common kingsnake	1	0.00	1	0.24	0.1	0.00
Alligator mississippiensis	Alligator	115	0.51	1	0.24	63.04	0.98
Siren lacertina	Greater siren	2	0.01	1	0.24	0.21	0.00
Bufonidae	Toads	4	0.02	4	0.95	0.15	0.00
Ranidae	Frogs	3	0.01	3	0.71	0.27	0.00
Chondrichthyes	Cartilaginous Fish	13	0.06	1	0.24	1.76	0.03
Osteichthyes	Bony Fish	1590	7.09	34	8.10	62.58	0.97
c.f. *Lepisosteus* sp.	Gar	1	0.00	1	0.24	0.06	0.00
Lepisosteus sp.	Gar	130	0.58	1	0.24	15.74	0.24
Lepisosteus osseus	Longnose gar	1	0.00	1	0.24	0.29	0.00
Amia calva	Bowfin	18	0.08	1	0.24	2.25	0.03
Cyprinidae	Carp, true minnow	2	0.01	1	0.24	0.04	0.00
Cyprinus spp.	Carp	1	0.00	1	0.24	0.08	0.00
Siluriformes	Catfish	37	0.16	0	0.00	11.07	0.17
Ictalurus sp.	Freshwater catfish	20	0.09	2	0.48	7.63	0.12
Ictalurus punctatus	Channel catfish	8	0.04	1	0.24	3.17	0.05
Arius felis	Hardhead catfish	6	0.03	2	0.48	1.04	0.02
Bagre marinus	Gafftopsail catfish	1	0.00	1	0.24	0.3	0.00
Centropomus undecimalis	Common snook	7	0.03	4	0.95	3.4	0.05

Table 3.1: cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Micropterus salmoides	Largemouth bass	1	0.00	1	0.24	0.13	0.00
Caranx crysos	Blue runner	7	0.03	5	1.19	0.13	0.00
Caranx hippos	Crevalle Jack	3	0.01	1	0.24	1.18	0.02
Lutjanus sp.	Snappers	1	0.00	1	0.24	0.22	0.00
Lutjanus griseus	Gray snapper	14	0.06	8	1.90	2.81	0.04
Archosargus probatocephalus	Sheepshead	3	0.01	1	0.24	1.03	0.02
Cynoscion sp.	Seatrouts	1	0.00	0	0.00	0.15	0.00
Cynoscion arenarius	Sand seatrout	5	0.02	2	0.48	0.39	0.01
Cynoscion nebulosus	Spotted seatrout	3	0.01	2	0.48	0.45	0.01
Menticirrhus americanus	Southern kingfish	1	0.00	1	0.24	0.18	0.00
*Bairdiella sanctaelucia*e	Striped croaker	1	0.00	1	0.24	0.11	0.00
Micropogonias undulatus	Atlantic croaker	1	0.00	1	0.24	0.05	0.00
Scomberomorus maculatus	Spanish mackerel	1	0.00	1	0.24	0.07	0.00
Sphoeroides nephelus	Southern Puffer	1	0.00	1	0.24	0.12	0.00
Invertebrata	Invertebrates	10	0.04	0	0.00	2.38	0.04
Decapoda	Crustaceans	1	0.00	1	0.24	0.02	0.00
Bivalvia	Bivalves	912	4.07	0	0.00	65.6	1.02
Bivalvia <2.0mm	Bivalves sieved <2.0mm	0	0.00	0	0.00	1221.17	18.93
Bivalvia 2.0mm	Bivalves sieved 2.0mm	0	0.00	0	0.00	1791.72	27.78
Bivalvia 4.0mm	Bivalves sieved 4.0mm	9187	40.95	0	0.00	378.03	5.86
Bivalvia 6.3mm	Bivalves sieved 6.3mm	4332	19.31	0	0.00	395.02	6.12
Mytilidae	Saltwater mussels	121	0.54	38	9.05	25.67	0.40
Brachidontes exustus	Scorched mussel	3	0.01	1	0.24	1.55	0.02
Brachidontes modiolus	Yellow mussel	3	0.01	2	0.48	2.01	0.03

Table 3.1: cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Geukensia demissa	Ribbed mussel	1	0.00	1	0.24	0.39	0.01
Ischadium recurvum	Hooked mussel	7	0.03	3	0.71	4.56	0.07
Crassostrea virginica	Eastern oyster	3	0.01	1	0.24	3.76	0.06
Unionidae	Freshwater bivalves	3	0.01	1	0.24	3.2	0.05
Gastropoda	Gastropods	889	3.96	23	5.48	163.94	2.54
Naticidae	Moon snails	9	0.04	1	0.24	9.86	0.15
Polinices sp.	Moon snail	6	0.03	1	0.24	4.57	0.07
Busycon sinistrum	Lightning whelk	1	0.00	1	0.24	28	0.43
Olividae	Olive shells	3	0.01	3	0.71	0.78	0.01
Olivella floralia	Dwarf olive	2	0.01	2	0.48	3.34	0.05
Melongena corona	Florida crown conch	269	1.20	108	25.71	602.31	9.34
Viviparidae	Freshwater gastropods	3	0.01	3	0.71	3.64	0.06
Campeloma spp.	Freshwater snails	9	0.04	4	0.95	4.92	0.08
Campeloma decisum	Pointed campeloma	3	0.01	3	0.71	4.5	0.07
Stylomatophora	Terrestrial snails	53	0.24	50	11.90	0.89	0.01
Totals		22432	100.00	420	100.00	6450.65	100.00

Hunter's Camp Feature Analysis

Faunal materials were excavated from four features at the Hunter's Camp site. Features were assessed separately due to the excavations. Faunal elements were removed during the initial sorting in the field. Features were distinguished due to the difference in appearance during excavation.

Feature B-5

Feature B-5 is a circular pit feature that is 20-40 cmdb (Thomas Penders, personal communication 2011). The feature extended into the south wall of Test Unit B, and field specimen 127 was associated with this feature. This feature yielded what was described in the field as a bone pin. There were also six large mammal bone fragments, some of which refit. After re-analysis in the lab as a part of this thesis, these elements could not definitively be described as a bone pin or bone pin fragments (Table 3.2) (Tanya Peres, personal communication 2011).

Table 3.2: Analyzed fauna, Feature B-5, Hunter's Camp (8Br2508), Brevard County, Florida

Taxon	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Mammalia, lg	6	100	1	100	6.32	100

Feature C-4

Feature C-4 is also a pit feature that is ovoid in shape. The feature extended to 44-60 cmbd (Thomas Penders, personal communication 2011). Field Specimen 105 was associated with this feature. Feature C-4 yielded unidentified turtle elements, as well as a metapodial fragment from a small-medium mammal (Table 3.3).

Table 3.3: Analyzed fauna, Feature C-4, Hunter's Camp (8Br2508), Brevard County, Florida

Taxon	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Vertebrata	2	33.33	0	0	0.12	14.29
Mammalia	1	16.67	1	50	0.11	13.10
Testudines	3	50.00	1	50	0.61	72.62
Totals	6	100.00	2	100	0.84	100.00

Feature D-1

Feature D-1 also was a pit feature. The feature was a circular-shaped area of shell and charcoal that was located at 30-67 cmbd (Thomas Penders, personal communication 2011). The feature disappeared at 67 cmdb, and then reappeared at 71 cmdb. The feature terminated at a depth of 80 cmbd (Thomas Penders, personal communication 2011). The faunal assemblage was recovered from Field Specimens 87, 88, and 91.

Feature D-1 yielded the greatest percentage (67.63 percent) of the faunal assemblage at Hunter's Camp. The feature was comprised of a total of 15,174 elements and fragments, the vast majority of which were bivalves. Most of these were too fragmentary to be identified beyond the class Bivalvia. However, ten bivalve fragments could be identified to genus and species, including the hooked mussel, scorched mussel, yellow mussel, and the eastern oyster. Eastern cotton-tail rabbit, alligator, Florida soft-shell turtle, squirrel, Eastern box turtle, Diamondback terrapin, chicken turtle, stinkpot, Eastern mud turtle, Florida red-bellied cooter, painted turtles, and ten species of fish are also present in this feature. There are only two otoliths found in the entire assemblage, and one of those comes from Feature D-1. The otolith, identified as hardhead catfish (*Ariopsis felis*), also showed evidence of being burned.

The bivalve elements comprised 13,810 elements of the total faunal collection from Feature D-1. Field Specimens 87 and 88 were initially screened in 1/8-inch mesh since they were part of a feature. In the lab, these bags were then screened through nested geological sieves (6.3mm, 4.0mm, 2.0mm, and <2.0mm). Because of the severe fragmentation of the shell, the geological sieves became necessary in order to separate identifiable and countable material. In addition, if these smaller sizes had been counted, the NISP values would have been greatly inflated. Only the elements in the 6.3 mm and the 4.0 mm were counted. The elements in the 2.0

mm and the <2.0mm were weighed. NISP and MNI counts are much more reliable in assessing the abundance of a species; however, due to the fragmentary nature of these remains, these types of assessments were not plausible (Mason et al. 1998). While sieving the shell, several vertebrate elements were sorted out as well. The majority of the remaining assemblage was either from turtle or fish (Table 3.4).

Table 3.4: Analyzed fauna, Feature D-1, Hunter's Camp (8Br2508), Brevard County, Florida

Taxon	**NISP**	**% NISP**	**MNI**	**% MNI**	**Weight (g)**	**% Weight**
Vertebrata	14	0.09	0	0.00	1.31	0.03
Mammalia	6	0.04	1	0.55	1.54	0.04
Mammalia, sm.	1	0.01	0	0.00	0.19	0.00
Mammalia, med.	1	0.01	1	0.55	2.95	0.07
Sylvilagus sp.	1	0.01	1	0.55	1.01	0.03
Rodentia	1	0.01	1	0.55	0.01	0.00
Sciurus sp.	1	0.01	1	0.55	0.06	0.00
Aves	6	0.04	1	0.55	0.35	0.01
Testudines	92	0.61	0	0.00	19.47	0.49
Kinosternon sp.	1	0.01	1	0.55	0.06	0.00
Kinosternon subrubrum	1	0.01	1	0.55	0.4	0.01
Sternotherus odoratus	5	0.03	1	0.55	0.79	0.02
Chrysemys sp.	1	0.01	1	0.55	0.22	0.01
Deirochelys reticularia	1	0.01	1	0.55	1.09	0.03
Malaclemys terrapin	8	0.05	1	0.55	12.33	0.31
Pseudemys nelsoni	2	0.01	1	0.55	3.48	0.09
Terrapene carolina	8	0.05	1	0.55	2.08	0.05
Apalone ferox	23	0.15	1	0.55	14.7	0.37
Serpentes	7	0.05	0	0.00	0.5	0.01
Viperidae	1	0.01	0	0.00	0.54	0.01
Crotalus adamanteus	7	0.05	1	0.55	3.58	0.09
Colubridae	1	0.01	1	0.55	0.08	0.00
Alligator mississippiensis	25	0.17	1	0.55	10.81	0.27
Bufonidae	4	0.03	4	2.21	0.15	0.00
Ranidae	1	0.01	1	0.55	0.01	0.00
Osteichthyes	891	5.89	21	11.60	15.9	0.40
Lepisosteus sp.	25	0.17	1	0.55	1.3	0.03
Amia calva	1	0.01	1	0.55	0.07	0.00
Siluriformes	7	0.05	1	0.55	0.41	0.01

Table 3.4: Cont'd

Taxon	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Ictalurus punctatus	1	0.01	1	0.55	0.1	0.00
Arius felis	3	0.02	1	0.55	0.39	0.01
Caranx crysos	6	0.04	4	2.21	0.12	0.00
Lutjanus griseus	8	0.05	5	2.76	0.43	0.01
Cynoscion arenarius	2	0.01	1	0.55	0.09	0.00
Cynoscion nebulosus	2	0.01	1	0.55	0.22	0.01
Menticirrhus americanus	1	0.01	1	0.55	0.18	0.00
Scomberomorus maculatus	1	0.01	1	0.55	0.07	0.00
Decapoda	1	0.01	1	0.55	0.02	0.00
Bivalvia	13810	91.31	0	0.00	3802.08	96.64
Mytilidae	72	0.48	35	19.34	20.66	0.53
Brachidontes exustus	3	0.02	1	0.55	1.55	0.04
Brachidontes modiolus	3	0.02	2	1.10	2.01	0.05
Geukensia demissa	1	0.01	1	0.55	0.39	0.01
Ischadium recurvum	7	0.05	3	1.66	4.56	0.12
Crassostrea virginica	2	0.01	1	0.55	0.32	0.01
Unionidae	1	0.01	1	0.55	1.14	0.03
Gastropoda	56	0.37	23	12.71	3.89	0.10
Olivella floralia	1	0.01	1	0.55	0.71	0.02
Stylomatophora	50	0.33	50	27.62	0.65	0.02
Grand Total	15124	100.00	181	100.00	3934.32	100.00

Feature D-7

The final feature that was analyzed for this study was Feature D-7 at Hunter's Camp. This feature, identified in the field as a large midden deposit, was comprised of freshwater mussel (Thomas Penders, personal communication 2011). This feature extended 20-50 cmdb and was roughly 30 cm thick (Thomas Penders, personal communication 2011). Despite the description of this feature as a midden deposit of freshwater mussel, there were only a small number of invertebrate components (13 for this feature) which would suggest that it was not a shell midden. There was one freshwater gastropod present in this feature (*Campeloma* spp.) (Table 3.5).

Table 3.5: Analyzed fauna, Feature D-7, Hunter's Camp (8BR2508), Brevard County, Florida

Taxon	NISP	% NISP	MNI	% MNI	Weight (g)	% Weight
Vertebrata	5	3.36	0	0.00	0.55	4.04
Mammalia	5	3.36	1	5.88	1.3	9.54
Reptilia	1	0.67	0	0.00	0.84	6.17
Testudines	31	20.81	0	0.00	0.55	4.04
Sternotherus odoratus	3	2.01	1	5.88	1.11	8.15
Malaclemys reticularia	1	0.67	1	5.88	0.36	2.64
Terrapene carolina	2	1.34	1	5.88	0.71	5.21
Apalone ferox	3	2.01	1	5.88	1.4	10.28
Colubridae	1	0.67	1	5.88	0.05	0.37
Osteichthyes	34	22.82	2	11.76	0.5	3.67
c.f. *Lepisosteus* sp.	1	0.67	1	5.88	0.06	0.44
Lepisosteus sp.	3	2.01	1	5.88	0.11	0.81
Siluriformes	1	0.67	1	5.88	0.34	2.50
Caranx crysos	1	0.67	1	5.88	0.01	0.07
Lutjanus griseus	1	0.67	1	5.88	0.02	0.15
Invertebrata	1	0.67	0	0.00	0.09	0.66
Bivalvia	40	26.85	1	5.88	1.18	8.66
Gastropoda	13	8.72	1	5.88	3.13	22.98
Olividae	1	0.67	1	5.88	0.28	2.06
Campeloma decisum	1	0.67	1	5.88	1.03	7.56
Totals	149	100.00	17	100.00	13.62	100.00

Field Specimens Recovered from Non-Feature Contexts

There were a total of 37 field specimens that were not contained in features, and were excavated as part of shovel tests or general excavation units. The remainder of the faunal assemblage (NISP = 7,152) was recovered from these field specimens. The greatest diversity of species, and some of the more interesting species, came from these field specimens, including elements that suggest seasonal occupation of the site and elements from marine animals. Field Specimen 28 yielded a lightning whelk (*Busycon sinistrum*) fragment. Field specimen 54 yielded a medial coracoid fragment from a canvasback duck (*Aythya* valisineria) and a mandibular horizontal ramus fragment of a grey fox (*Urocyon cinereoargenteus*). Field specimens 69 and 71 produced elements of the canvasback duck (*Aythya valisineria*), including a humerus, a proximal ulna fragment, and a distal fragment of a carpometacarpus. Field specimen 71 also yielded a complete tarsometatarsus of the pied-billed grebe (*Podilymbus podiceps*). Finally, field specimen 72 yielded a horizontal ramus fragment of the mandible, which included the first and second molar and the fourth premolar, of the Northern river otter (*Lontra canadensis*), a vertebral fragment of the loggerhead sea turtle (*Caretta caretta*), and a medial coracoid fragment of the canvasback duck (*Aythya valisineria*).

Palm Hammock

The Palm Hammock faunal assemblage is comprised of 3,481 elements that weigh 1,873.14 grams (g) (Table 3.6). The majority of the weight came from the following taxa: turtles (Testudines) (468.81g), Florida soft-shelled turtle (*Apalone ferox*) (274.16g), pond or marsh turtles (Emydidae) (138.89g), and white-tailed deer (*Odocoileus virginianus*) (133.93g). The total MNI for this assemblage is 187, with the majority coming from bony fish (Osteichthyes) and the Mesa Ram’s Horn (*Planorbella scalaris*). Of the 3,481 elements, 601 exhibit evidence of heat alteration. Seventeen elements exhibited signs of modification, with one of the elements (*Busycon* sp.) categorized as a shell tool, and another, also a *Busycon* sp. categorized as a shell ornament.

Table 3.6: Total analyzed faunal assemblage; Palm Hammock (8Br2509), Brevard County,

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Vertebrata	Vertebrates	369	10.60	0	0.00	100.88	5.39
Mammalia	Mammals	36	1.03	0	0.00	28.46	1.52
Mammalia, sm	Small Mammals	8	0.23	0	0.00	1.69	0.09
Mammalia, sm-med	Small - Medium Mammals	1	0.03	0	0.00	1.35	0.07
Mammalia, med	Medium Mammals	2	0.06	0	0.00	0.81	0.04
Mammalia, lg	Large Mammals	26	0.75	0	0.00	43.09	2.30
Didelphis virginiana	Virginia opossum	11	0.32	2	1.04	4.19	0.22
Scalopus aquaticus	Eastern mole	1	0.03	1	0.52	0.11	0.01
Sylvilagus spp.	Rabbits	1	0.03	1	0.52	0.15	0.01
Sylvilagus floridanus	Cottontail rabbits	8	0.23	3	1.55	4.88	0.26
Rodentia	Rodents	12	0.34	0	0.00	0.89	0.05
Sciurus spp.	Squirrels	1	0.03	1	0.52	1.36	0.07
Sciurus carolinensis	Eastern gray squirrel	2	0.06	2	1.04	0.66	0.04
Neotoma floridana	Eastern wood rat	2	0.06	2	1.04	0.8	0.04
Urocyon cinereogenteus	Gray fox	1	0.03	1	0.52	0.53	0.03
Mephitis mephitis	Striped skunk	6	0.17	1	0.52	4.2	0.22
Ursus americanus	Black bear	1	0.03	1	0.52	0.97	0.05
Procyon lotor	Raccoon	11	0.32	3	1.55	26.67	1.42
Lontra canadensis	Northern River Otter	5	0.14	2	1.04	6.63	0.35
Lynx rufus	Bobcat	1	0.03	1	0.52	0.98	0.05
Odocoileus virginianus	White-tailed deer	24	0.69	3	1.55	133.93	7.15
Aves	Birds	26	0.75	0	0.00	6.18	0.33
Aves, sm	Small birds	4	0.11	0	0.00	0.56	0.03
Aves, sm-med.	Small-medium birds	5	0.14	0	0.00	1.91	0.10

Table 3.6: Cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Aves, med	Medium Birds	3	0.09	0	0.00	1.49	0.08
Aves, med-lg	Medium-large birds	3	0.09	0	0.00	1.27	0.07
Aves, lg.	Large Birds	1	0.03	0	0.00	1.1	0.06
Anseriformes	Waterbirds	1	0.03	0	0.00	0.62	0.03
Anas carolinensis	Green-Winged Teal	1	0.03	1	0.52	0.24	0.01
Anas discors	Blue-Winged Teal	2	0.06	2	1.04	0.9	0.05
Anas platyrhynchos	Mallard	1	0.03	1	0.52	0.36	0.02
Aythya americana	Redhead	2	0.06	2	1.04	0.57	0.03
Aythya valisineria	Canvasback	4	0.11	3	1.55	1.83	0.10
Aix sponsa	Wood duck	2	0.06	2	1.04	1.71	0.09
Bucephala albeola	Bufflehead	1	0.03	1	0.52	0.34	0.02
Bucephala clangula	Common Goldeneye	1	0.03	1	0.52	0.24	0.01
Lophodytes cucullatus	Hooded Merganser	1	0.03	1	0.52	0.17	0.01
Podilymbus podiceps	Pied-billed grebe	2	0.06	1	0.52	0.94	0.05
c.f. *Butorides virescens*	Green Heron	1	0.03	1	0.52	0.26	0.01
Eudocimus albus	American white ibis	1	0.03	1	0.52	1.53	0.08
Passeriformes	Perching Birds	1	0.03	0	0.00	0.01	0.00
Reptilia	Reptiles	2	0.06	0	0.00	1.56	0.08
Testudines	Turtles	1264	36.31	0	0.00	468.81	25.03
Chelydra serpentina	Common snapping turtle	9	0.26	3	1.55	13.22	0.71
Cheloniidae	Sea Turtles	1	0.03	1	0.52	9.48	0.51
Kinosternidae	Mud/musk turtles	142	4.08	4	2.07	33.12	1.77
Kinosternon spp.	Mud Turtles	2	0.06	2	1.04	0.9	0.05

Table 3.6: Cont'd

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Kinosternon baurii	Striped Mud Turtle	36	1.03	6	3.11	13.86	0.74
Kinosternon subrubrum	Eastern Mud Turtle	62	1.78	5	2.59	20.56	1.10
Sternotherus odoratus	Stinkpot	72	2.07	5	2.59	19.77	1.06
Emydidae	Pond or Marsh Turtles	80	2.30	0	0.00	138.89	7.41
Chrysemys spp.	Painted Turtles	2	0.06	1	0.52	1.82	0.10
Deirochelys reticularia	Chicken Turtle	11	0.32	2	1.04	19.29	1.03
Malaclemys terrapin	Diamondback terrapin	11	0.32	4	2.07	16.74	0.89
Pseudemys nelsoni	Florida red-bellied cooter	4	0.11	2	1.04	6.01	0.32
Trachemys scripta	Pond Slider	11	0.32	3	1.55	23.64	1.26
Terrapene carolina	Eastern box turtle	49	1.41	7	3.63	52.92	2.83
Gopherus polyphemus	Gopher tortoise	12	0.34	2	1.04	42.65	2.28
Apalone ferox	Florida soft-shelled turtle	260	7.47	4	2.07	274.16	14.64
Lacertilia	Lizards	2	0.06	1	0.52	0.73	0.04
Serpentes	Snakes	31	0.89	0	0.00	4.92	0.26
Viperidae	Pit vipers	2	0.06	0	0.00	1.51	0.08
Agkistrodon piscivorus	Water moccasin	4	0.11	2	1.04	2.2	0.12
Crotalus adamanteus	Eastern diamondback rattlesnake	4	0.11	2	1.04	2.77	0.15
Colubridae	Colubrid Snakes	11	0.32	0	0.00	3.62	0.19
Coluber spp.	Racers	1	0.03	0	0.00	0.15	0.01
Coluber constrictor	Racer	1	0.03	1	0.52	0.18	0.01

Table 3.6: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Pantherophis guttatus	Corn snake	2	0.06	1	0.52	0.78	0.04
Lampropeltis spp.	Kingsnakes	3	0.09	1	0.52	0.77	0.04
Lampropeltis getula	Common kingsnake	1	0.03	1	0.52	0.21	0.01
Nerodia spp.	Water snakes	4	0.11	1	0.52	1.69	0.09
Thamnophis sirtalis	Common Garter Snake	1	0.03	1	0.52	0.17	0.01
Alligator mississippiensis	Alligator	22	0.63	2	1.04	25.04	1.34
Siren lacertina	Greater siren	1	0.03	1	0.52	0.18	0.01
Anura	Frogs	1	0.03	1	0.52	0.28	0.01
Chondrichthyes	Cartilaginous Fish	2	0.06	1	0.52	0.32	0.02
Osteichthyes	Bony Fish	406	11.66	11	5.70	44.46	2.37
Lepisosteus osseus	Longnose gar	66	1.90	2	1.04	9.52	0.51
Amia calva	Bowfin	21	0.60	3	1.55	4.66	0.25
Cyprinidae	Carp, true minnow	9	0.26	2	1.04	0.63	0.03
Siluriformes	Catfish	25	0.72	0	0.00	6.57	0.35
Ictalurus spp.	Freshwater catfish	21	0.60	5	2.59	8.57	0.46
Ictalurus punctatus	Channel catfish	11	0.32	3	1.55	7.88	0.42
Ariopsis felis	Hardhead catfish	1	0.03	1	0.52	0.72	0.04
Bagre marinus	Gafftopsail catfish	4	0.11	2	1.04	1.11	0.06
Centropomus undecimalis	Common snook	2	0.06	2	1.04	0.1	0.01
Epinephelus spp.	Groupers	1	0.03	1	0.52	0.65	0.03
Centrarchidae	Sunfishes	3	0.09	1	0.52	0.36	0.02
Caranx hippos	Crevalle Jack	3	0.09	2	1.04	0.9	0.05
Chloroscombrus chrysurus	Atlantic Bumper	1	0.03	1	0.52	0.31	0.02
Coryphaena hippurus	Mahi-Mahi	1	0.03	1	0.52	0.43	0.02
Lutjanus spp.	Snappers	1	0.03	1	0.52	1.05	0.06

Table 3.6: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Lutjanus griseus	Gray snapper	6	0.17	2	1.04	3.58	0.19
Aplodinotus grunniens	Freshwater drum	13	0.37	2	1.04	1.95	0.10
Bairdiella sanctaeluciae	Striped croaker	2	0.06	2	1.04	0.5	0.03
Cynoscion nebulosus	Spotted seatrout	2	0.06	2	1.04	0.5	0.03
Menticirrhus americanus	Southern kingfish	1	0.03	1	0.52	0.02	0.00
Mugil cephalus	Striped mullet	17	0.49	2	1.04	4.22	0.23
Sphoeroides spp.	Southern Puffer	1	0.03	1	0.52	0.34	0.02
Mollusca	Molluscs	4	0.11	0	0.00	0.03	0.00
Bivalvia	Bivalves	26	0.75	0	0.00	3.77	0.20
Mytilidae	Saltwater mussels	58	1.67	3	1.55	8.61	0.46
Brachidontes modiolus	Yellow mussel	1	0.03	1	0.52	0.31	0.02
Gastropoda	Gastropods	13	0.37	0	0.00	5.89	0.31
Neverita duplicata	Shark eye	1	0.03	1	0.52	25.76	1.38
Busycon spp.	Whelks	4	0.11	2	1.04	100.75	5.38
Olivella spp.	Olive shells	3	0.09	3	1.55	1.76	0.09
Olivella floralia	Dwarf olive	1	0.03	1	0.52	0.53	0.03
Melongena corona	Florida crown conch	9	0.26	2	1.04	23.77	1.27
Campeloma spp.	Freshwater snails	1	0.03	1	0.52	0.85	0.05
Campeloma decisum	Pointed campeloma	3	0.09	3	1.55	2.43	0.13
Planorbella spp.	Ram's Horn snails	1	0.03	1	0.52	0.03	0.00
Planorbella duryi	Seminole Ram's Horn	1	0.03	1	0.52	0.9	0.05
Planorbella scalaris	Mesa Ram's Horn	15	0.43	15	7.77	3.57	0.19
Pomacea paludosa	Florida apple snail	7	0.20	1	0.52	5.26	0.28
Total		3481	100.00	193	100.00	1873.14	100.00

Phase I Excavation

As mentioned previously, the initial identification of the Palm Hammock site was the result of area shovel testing through phase I survey. Phase I shovel testing at this site recovered 821 faunal elements and fragments of the total 3,481 elements and fragments, roughly 23.6 percent of the entire assemblage. The total weight of the Phase I fauna was 494.53g, 26.4 percent of the entire assemblage. The MNI total of the Phase I excavations was 88, which is 47.1 percent of the Palm Hammock MNI. The Phase I excavations yielded many of the specimens used to estimate seasonality, including the mallard (*Anas platyrhynchos*), Blue-winged teal (*Aythya discors*), redhead (*Aythya americana*), canvasback (*Aythya valisineria*), and pied-billed grebe (*Podilymbus podiceps*). In addition, many marine species of fish, including mahi-mahi (*Coryphaena hippurus*), gafftopsail catfish (*Bagre marinus*), common snook (*Centropomus undecimalis*), striped croaker (*Bairdiella sanctaelucia*e), and spotted seatrout (*Cynoscion nebulosus*) were identified from the Phase I excavations (Table 3.7).

Table 3.7: Phase I analyzed assemblage; Palm Hammock (8Br2509), Brevard County, Florida

Taxon	**Common Name**	**NISP**	**% NISP**	**MNI**	**% MNI**	**Weight**	**% Weight**
Vertebrata	Vertebrates	61	7.43	0	0.00	25.17	5.09
Mammalia	Mammals	16	1.95	0	0.00	11.92	2.41
Mammalia, sm	Small Mammals	2	0.24	0	0.00	0.58	0.12
Mammalia, lg	Large Mammals	12	1.46	0	0.00	23.45	4.74
Didelphis virginiana	Virginia opossum	9	1.10	1	1.14	1.6	0.32
Sylvilagus floridanus	Cottontail rabbits	4	0.49	1	1.14	2.08	0.42
Rodentia	Rodents	7	0.85	0	0.00	0.46	0.09
Sciurus spp.	Squirrels	1	0.12	1	1.14	1.36	0.28
Sciurus carolinensis	Eastern gray squirrel	1	0.12	1	1.14	0.42	0.08
Neotoma floridana	Eastern wood rat	1	0.12	1	1.14	0.78	0.16

Table 3.7: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Mephitis mephitis	Striped skunk	6	0.73	1	1.14	4.2	0.85
Procyon lotor	Raccoon	2	0.24	1	1.14	1.09	0.22
Odocoileus virginianus	White-tailed deer	11	1.34	1	1.14	76.11	15.39
Aves	Birds	9	1.10	0	0.00	3.27	0.66
Aves, sm	Small birds	2	0.24	0	0.00	0.27	0.05
Aves, med	Medium Birds	2	0.24	0	0.00	1.31	0.26
Aves, med-lg	Medium-large birds	1	0.12	0	0.00	0.28	0.06
Aves, lg.	Large Birds	1	0.12	0	0.00	1.1	0.22
Anseriformes	Waterbirds	1	0.12	0	0.00	0.62	0.13
Anas discors	Blue-Winged Teal	2	0.24	2	2.27	0.9	0.18
Anas platyrhynchos	Mallard	1	0.12	1	1.14	0.36	0.07
Aythya americana	Redhead	1	0.12	1	1.14	0.39	0.08
Aythya valisineria	Canvasback	1	0.12	1	1.14	0.46	0.09
Aix sponsa	Wood duck	1	0.12	1	1.14	0.93	0.19
Bucephala albeola	Bufflehead	1	0.12	1	1.14	0.34	0.07
Lophodytes cucullatus	Hooded Merganser	1	0.12	1	1.14	0.17	0.03
Podilymbus podiceps	Pied-billed grebe	2	0.24	1	1.14	0.94	0.19
Eudocimus albus	American white ibis	1	0.12	1	1.14	1.53	0.31
Reptilia	Reptiles	2	0.24	0	0.00	1.56	0.32
Testudines	Turtles	218	26.55	0	0.00	95.82	19.38
Chelydra serpentina	Common snapping turtle	1	0.12	1	1.14	0.62	0.13
Kinosternidae	Mud/musk turtles	43	5.24	1	1.14	10.96	2.22
Kinosternon spp.	Mud Turtles	1	0.12	1	1.14	0.44	0.09
Kinosternon baurii	Striped Mud Turtle	9	1.10	3	3.41	4.77	0.96
Kinosternon subrubrum	Eastern Mud Turtle	10	1.22	2	2.27	4.44	0.90
Sternotherus odoratus	Stinkpot	29	3.53	2	2.27	7.43	1.50

Table 3.7: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Emydidae	Pond or Marsh Turtles	16	1.95	0	0.00	15.61	3.16
Deirochelys reticularia	Chicken Turtle	3	0.37	1	1.14	1.71	0.35
Malaclemys terrapin	Diamondback terrapin	2	0.24	1	1.14	1.27	0.26
Pseudemys nelsoni	Florida red-bellied cooter	2	0.24	1	1.14	2.47	0.50
Trachemys scripta	Pond Slider	2	0.24	1	1.14	1.82	0.37
Terrapene carolina	Eastern box turtle	16	1.95	2	2.27	18.71	3.78
Gopherus polyphemus	Gopher tortoise	3	0.37	1	1.14	13.22	2.67
Apalone ferox	Florida soft-shelled turtle	54	6.58	2	2.27	46.32	9.37
Serpentes	Snakes	5	0.61	0	0.00	0.62	0.13
Agkistrodon piscivorus	Water moccasin	1	0.12	1	1.14	0.38	0.08
Crotalus adamanteus	Eastern diamondback rattlesnake	2	0.24	1	1.14	0.74	0.15
Colubridae	Colubrid Snakes	4	0.49	0	0.00	1.18	0.24
Lampropeltis spp.	Kingsnakes	2	0.24	1	1.14	0.59	0.12
Alligator mississippiensis	Alligator	6	0.73	1	1.14	6.99	1.41
Siren lacertina	Greater siren	1	0.12	1	1.14	0.18	0.04
Anura	Frogs	1	0.12	1	1.14	0.28	0.06
Osteichthyes	Bony Fish	68	8.28	1	1.14	15.32	3.10
Lepisosteus osseus	Longnose gar	4	0.49	1	1.14	0.65	0.13
Amia calva	Bowfin	7	0.85	1	1.14	1.73	0.35
Cyprinidae	Carp, true minnow	3	0.37	1	1.14	0.41	0.08
Siluriformes	Catfish	3	0.37	0	0.00	0.34	0.07
Ictalurus spp.	Freshwater catfish	16	1.95	1	1.14	7.64	1.54
Ictalurus punctatus	Channel catfish	3	0.37	1	1.14	2.17	0.44
Bagre marinus	Gafftopsail catfish	2	0.24	1	1.14	0.78	0.16

Table 3.7: Cont.d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Centropomus undecimalis	Common snook	1	0.12	1	1.14	0.06	0.01
Centrarchidae	Sunfishes	2	0.24	1	1.14	0.23	0.05
Caranx hippos	Crevalle Jack	1	0.12	1	1.14	0.46	0.09
Coryphaena hippurus	Mahi-Mahi	1	0.12	1	1.14	0.43	0.09
Lutjanus griseus	Gray snapper	1	0.12	1	1.14	0.54	0.11
Aplodinotus grunniens	Freshwater drum	1	0.12	1	1.14	0.12	0.02
Bairdiella sanctaelucaiae	Striped croaker	1	0.12	1	1.14	0.25	0.05
Cynoscion nebulosus	Spotted seatrout	1	0.12	1	1.14	0.31	0.06
Mugil cephalus	Striped mullet	9	1.10	1	1.14	3.22	0.65
Bivalvia	Bivalves	12	1.46	0	0.00	2.72	0.55
Mytilidae	Saltwater mussels	54	6.58	2	2.27	7.53	1.52
Brachidontes modiolus	Yellow mussel	1	0.12	1	1.14	0.31	0.06
Gastropoda	Gastropods	4	0.49	0	0.00	1.41	0.29
Neverita duplicata	Shark eye	1	0.12	1	1.14	25.76	5.21
Olivella spp.	Olive shells	3	0.37	3	3.41	1.76	0.36
Olivella floralia	Dwarf olive	1	0.12	1	1.14	0.53	0.11
Melongena corona	Florida crown conch	2	0.24	1	1.14	7.14	1.44
Campeloma spp.	Freshwater snails	1	0.12	1	1.14	0.85	0.17
Campeloma decisum	Pointed campeloma	3	0.37	3	3.41	2.43	0.49
Planorbella spp.	Ram's Horn snails	1	0.12	1	1.14	0.03	0.01
Planorbella duryi	Seminole Ram's Horn	1	0.12	1	1.14	0.9	0.18
Planorbella scalaris	Mesa Ram's Horn	13	1.58	13	14.77	3.02	0.61
Pomacea paludosa	Florida apple snail	7	0.85	1	1.14	5.26	1.06
Total		821	100.00	88	100.00	494.53	100.00

Phase III Excavation

As described above, the Phase III fauna were excavated from four test units and 30 soil samples, comprising 76.4 percent of the total assemblage. There were 2,661 elements and fragments present in this assemblage, and the elements weighed 1,378.07 g, which comprises 73.6 percent of the assemblage. With the higher NISP count, the MNI for this assemblage is going to be significantly higher. The MNI for the Phase III assemblage is 110, which is 58.8 percent of the total MNI of the entire assemblage. The Phase III excavations yielded the majority of the mammals in the assemblage, including the Virginia opossum (*Didelphis virginiana*), Eastern mole (*Scalopus aquaticus*), Eastern cottontail rabbit (*Sylvilagus floridanus*), Eastern gray squirrel (*Sciurus carolinensis*), Eastern wood rat (*Neotoma floridana*), gray fox (*Urocyon cinereogenteus*), raccoon (*Procyon lotor*), Northern river otter (*Lontra canadensis*), bobcat (*Lynx rufus*), and white-tailed deer (*Odocoileus virginianus*).

Like the Phase I excavations, the Phase III fauna also included many of the species used to determine seasonality, including the green-winged teal (*Anas carolinensis*), redhead (*Aythya americana*), and canvasback (*Aythya valisineria*). Just as withthe Phase I fauna, the Phase III fauna included many marine species: hardhead catfish (*Ariopsis felis*), gafftopsail catfish (*Bagre marinus*), common snook (*Centropomus undecimalis*), crevalle jack (*Caranx hippos*), Atlantic bumper (*Chloroscombrus chrysurus*), gray snapper (*Lutjanus griseus*), spotted seatrout (*Cynoscion nebulosus*), southern kingfish (*Menticirrhus americanus*), and puffers (*Sphoeroides* spp.) (Table 3.8).

Table 3.8: Phase III analyzed assemblage; Palm Hammock (8Br2509), Brevard County, Florida

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Vertebrata	Vertebrates	308	11.57	0	0.00	75.71	5.50
Mammalia	Mammals	20	0.75	0	0.00	16.54	1.20
Mammalia, sm	Small Mammals	6	0.23	0	0.00	1.11	0.08
Mammalia, sm-med	Small - Medium Mammals	1	0.04	0	0.00	1.35	0.10
Mammalia, med	Medium Mammals	2	0.08	0	0.00	0.81	0.06
Mammalia, lg	Large Mammals	14	0.53	0	0.00	19.64	1.43
Didelphis virginiana	Virginia opossum	2	0.08	1	0.91	2.59	0.19
Scalopus aquaticus	Eastern mole	1	0.04	1	0.91	0.11	0.01
Sylvilagus spp.	Rabbits	1	0.04	1	0.91	0.15	0.01
Sylvilagus floridanus	Cottontail rabbits	4	0.15	2	1.82	2.8	0.20
Rodentia	Rodents	5	0.19	0	0.00	0.43	0.03
Sciurus carolinensis	Eastern gray squirrel	1	0.04	1	0.91	0.24	0.02
Neotoma floridana	Eastern wood rat	1	0.04	1	0.91	0.02	0.00
Urocyon cinereogenteus	Gray fox	1	0.04	1	0.91	0.53	0.04
Ursus americanus	Black Bear	1	0.04	1	0.91	0.97	0.07
Procyon lotor	Raccoon	9	0.34	2	1.82	25.58	1.86
Lontra canadensis	Northern River Otter	5	0.19	2	1.82	6.63	0.48
Lynx rufus	Bobcat	1	0.04	1	0.91	0.98	0.07
Odocoileus virginianus	White-tailed deer	13	0.49	2	1.82	57.82	4.20
Aves	Birds	17	0.64	0	0.00	2.91	0.21
Aves, sm	Small birds	2	0.08	0	0.00	0.29	0.02

Table 3.8: Cont.d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Aves, sm-med.	Small-medium birds	5	0.19	0	0.00	1.91	0.14
Aves, med	Medium Birds	1	0.04	0	0.00	0.18	0.01
Aves, med-lg	Medium-large birds	2	0.08	0	0.00	0.99	0.07
Anas carolinensis	Green-Winged Teal	1	0.04	1	0.91	0.24	0.02
Aythya americana	Redhead	1	0.04	1	0.91	0.18	0.01
Aythya valisineria	Canvasback	3	0.11	2	1.82	1.37	0.10
Aix sponsa	Wood duck	1	0.04	1	0.91	0.78	0.06
Bucephala clangula	Common Goldeneye	1	0.04	1	0.91	0.24	0.02
c.f. *Butorides virescens*	Green Heron	1	0.04	1	0.91	0.26	0.02
Passeriformes	Perching Birds	1	0.04	0	0.00	0.01	0.00
Testudines	Turtles	1046	39.31	0	0.00	372.99	27.09
Chelydra serpentina	Common snapping turtle	8	0.30	2	1.82	12.6	0.91
Cheloniidae	Sea Turtles	1	0.04	1	0.91	9.48	0.69
Kinosternidae	Mud/musk turtles	99	3.72	4	3.64	22.16	1.61
Kinosternon spp.	Mud Turtles	1	0.04	1	0.91	0.46	0.03
Kinosternon baurii	Striped Mud Turtle	27	1.01	3	2.73	9.09	0.66
Kinosternon subrubrum	Eastern Mud Turtle	52	1.95	3	2.73	16.12	1.17
Sternotherus odoratus	Stinkpot	43	1.62	3	2.73	12.34	0.90
Emydidae	Pond or Marsh Turtles	64	2.41	0	0.00	123.28	8.95
Chrysemys spp.	Painted Turtles	2	0.08	1	0.91	1.82	0.13
Deirochelys reticularia	Chicken Turtle	8	0.30	1	0.91	17.58	1.28

Table 3.8: Cont.d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Malaclemys terrapin	Diamondback terrapin	9	0.34	3	2.73	15.47	1.12
Pseudemys nelsoni	Florida red-bellied cooter	2	0.08	1	0.91	3.54	0.26
Trachemys scripta	Pond Slider	9	0.34	2	1.82	21.82	1.58
Terrapene carolina	Eastern box turtle	33	1.24	5	4.55	34.21	2.48
Gopherus polyphemus	Gopher tortoise	9	0.34	1	0.91	29.43	2.14
Apalone ferox	Florida soft-shelled turtle	206	7.74	2	1.82	227.84	16.54
Lacertilia	Lizards	2	0.08	1	0.91	0.73	0.05
Serpentes	Snakes	26	0.98	0	0.00	4.3	0.31
Viperidae	Pit vipers	2	0.08	0	0.00	1.51	0.11
Agkistrodon piscivorus	Water moccasin	3	0.11	1	0.91	1.82	0.13
Crotalus adamanteus	Eastern diamondback rattlesnake	2	0.08	1	0.91	2.03	0.15
Colubridae	Colubrid Snakes	7	0.26	0	0.00	2.44	0.18
Coluber spp.	Racers	1	0.04	0	0.00	0.15	0.01
Coluber constrictor	Racer	1	0.04	1	0.91	0.18	0.01
Pantherophis guttatus	Corn snake	2	0.08	1	0.91	0.78	0.06
Lampropeltis spp.	Kingsnakes	2	0.08	1	0.91	0.18	0.01
Lampropeltis getula	Common kingsnake	1	0.04	1	0.91	0.21	0.02
Nerodia spp.	Water snakes	4	0.15	1	0.91	1.69	0.12
Thamnophis sirtalis	Common Garter Snake	1	0.04	1	0.91	0.17	0.01

Table 3.8: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Alligator mississippiensis	Alligator	16	0.60	1	0.91	18.05	1.31
Chondrichthyes	Cartilaginous Fish	2	0.08	1	0.91	0.32	0.02
Osteichthyes	Bony Fish	338	12.70	11	10.00	29.14	2.12
Lepisosteus osseus	Longnose gar	62	2.33	1	0.91	8.87	0.64
Amia calva	Bowfin	14	0.53	2	1.82	2.93	0.21
Cyprinidae	Carp, true minnow	6	0.23	2	1.82	0.22	0.02
Siluriformes	Catfish	22	0.83	0	0.00	6.23	0.45
Ictalurus spp.	Freshwater catfish	5	0.19	4	3.64	0.93	0.07
Ictalurus punctatus	Channel catfish	8	0.30	2	1.82	5.71	0.41
Ariopsis felis	Hardhead catfish	1	0.04	1	0.91	0.72	0.05
Bagre marinus	Gafftopsail catfish	2	0.08	1	0.91	0.33	0.02
Centropomus undecimalis	Common snook	1	0.04	1	0.91	0.04	0.00
Epinephelus spp.	Groupers	1	0.04	1	0.91	0.65	0.05
Centrarchidae	Sunfishes	1	0.04	1	0.91	0.13	0.01
Caranx hippos	Crevalle Jack	2	0.08	1	0.91	0.44	0.03
Chloroscombrus chrysurus	Atlantic Bumper	1	0.04	1	0.91	0.31	0.02
Lutjanus spp.	Snappers	1	0.04	1	0.91	1.05	0.08
Lutjanus griseus	Gray snapper	5	0.19	1	0.91	3.04	0.22
Aplodinotus grunniens	Freshwater drum	12	0.45	1	0.91	1.83	0.13
Bairdiella sanctaeluciae	Striped croaker	1	0.04	1	0.91	0.25	0.02
Cynoscion nebulosus	Spotted seatrout	1	0.04	1	0.91	0.19	0.01
Menticirrhus americanus	Southern kingfish	1	0.04	1	0.91	0.02	0.00

Table 3.8: Cont.'d

Taxon	Common Name	NISP	% NISP	MNI	% MNI	Weight	% Weight
Mugil cephalus	Striped mullet	8	0.30	1	0.91	1	0.07
Sphoeroides spp.	Southern Puffer	1	0.04	1	0.91	0.34	0.02
Mollusca	Molluscs	4	0.15	0	0.00	0.03	0.00
Bivalvia	Bivalves	14	0.53	0	0.00	1.05	0.08
Mytilidae	Saltwater mussels	4	0.15	1	0.91	1.08	0.08
Gastropoda	Gastropods	9	0.34	0	0.00	4.48	0.33
Busycon spp.	Whelks	4	0.15	2	1.82	100.75	7.32
Melongena corona	Florida crown conch	7	0.26	1	0.91	16.63	1.21
Planorbella scalaris	Mesa Ram's Horn	2	0.08	2	1.82	0.55	0.04
Total		2661	100.00	110	100.00	1377.1	100.00

Analysis of the Sample

Hunter's Camp

The Malabar Period people that occupied the Hunter's Camp site exploited aquatic taxa almost to the near exclusion of all terrestrial taxa. The NISP for the aquatic species is 17,837, and the NISP for the terrestrial taxa is 583. The NISP values include elements that have been identified to class, family, genus, and/or species. Elements that belong to an order or suborder, such as snakes (Serpentes) or turtles (Testudines) are not included because many of those taxa are found in either environment, and without further identification it is not possible to tell which environment they would belong to. The class, order, and suborder that have been omitted from this chart include: mammals (Mammalia), turtles (Testudines), and snakes (Serpentes). The faunal assemblage was comprised overwhelmingly of taxa that are aquatic in nature. The aquatic taxa comprised 96.83 percent of the assemblage, and the terrestrial taxa comprised the remaining 3.17 percent. The assemblage was comprised mainly of specimens that were birds, reptiles, amphibians, or fish, either cartilaginous or bony. The Mammalian elements made up 3.35 percent of the NISP of the total analyzed faunal, while the birds, reptiles, amphibians, and fish combined accounted for 96.65 percent of the NISP of the analyzed vertebrate elements and fragments.

Of the vertebrate animals, turtles made up a significant portion of the diet. Several different species of turtle were identified in the assemblage, including the common snapping turtle, alligator snapping turtle, chicken turtle, loggerhead sea turtle, striped mud turtle, Eastern mud turtle, the stinkpot, painted turtles, pond slider, diamondback terrapin, Florida red-bellied cooter, Eastern box turtle, gopher tortoise, and Florida soft-shell turtle. The turtle taxa made up 61.61 percent of the analyzed fauna and all the other vertebrates made up the remaining 38.39 percent. Elements identified only to Vertebrata were left out of this comparison, due to the fact that they could not be assigned to a specific taxon.

Overall, the faunal assemblage was comprised of species that lived in freshwater, brackish, and/or marine waters (Table 3.9). There is overlap between some of these species because some of the marine taxa can survive in brackish or freshwater and several species can survive in all three types of environments. The freshwater component of the assemblage comprises 42.40 percent. The brackish component comprises 5.25 percent of the assemblage, and the marine component of the assemblage constitutes 52.36 percent. However, six of the larger species of marine fish species present in this assemblage live in the estuaries and lagoons as juveniles. These species include: common snook (*Centropomus undecimalis*), blue runner (*Caranx crysos*), Crevalle Jack (*Caranx hippos*), spotted seatrout (*Cynoscion nebulosus*), Southern kingfish (*Menticirrhus americanus*), and Spanish mackerel (*Scomberomorus maculatus*) (National Audubon Society 1983). It is possible that the elements identified were of juveniles, and the small nature of the elements could indicate that these individuals were, in fact, juveniles.

Table 3.9: Species of Fresh, Marine, and/or Brackish Waters, Hunter's Camp (8Br2508), Brevard County, Florida

Taxon	Common Name	Freshwater	Marine	Brackish
Chelydra serpentina	common snapping turtle	X		
Macroclemys temminckii	alligator snapping turtle	X		
Caretta caretta	Loggerhead Sea Turtle		X	
Kinosternon spp.	Mud Turtles	X		
Kinosternon baurii	Striped mud turtle	X		
Kinosternon subrubrum	Eastern mud turtle	X		
Sternotherus odoratus	Stinkpot	X		
Chrysemys sp.	painted turtles	X		
Deirochelys reticularia	chicken turtle	X		
Malaclemys terrapin	Diamondback terrapin	X	X	X
Pseudemys nelsoni	Florida red-bellied cooter	X		
Trachemys scripta	pond slider	X		
Apalone ferox	Florida soft-shelled turtle	X		
Siren lacertina	greater siren	X		
Chondrichthyes	cartilaginous fishes		X	X
Lepisosteus sp.	gar	X		
Lepisosteus osseus	longnose gar	X		
Amia calva	bowfin	X		
Cyprinus sp.	carp	X	X	X
Ictalurus punctatus	channel catfish	X		
Ariopsis felis	hardhead catfish		X	X
Bagre marinus	Gafftopsail catfish		X	
Centropomus undecimalis	common snook		X	
Micropterus salmoides	largemouth bass	X		
Caranx crysos	blue runner		X	
Caranx hippos	Crevalle Jack		X	
Lutjanus griseus	gray snapper	X	X	X
Archosargus probatocephalus	sheepshead		X	

Table 3.9: Cont.'d

Taxon	Common Name	Freshwater	Marine	Brackish
Cynoscion arenarius	sand seatrout	X	X	X
Cynoscion nebulosus	spotted seatrout		X	X
Menticirrhus americanus	Southern kingfish		X	
Bairdiella sanctaeluciae	striped croaker		X	
Micropogonias undulates	Atlantic croaker		X	X
Mugil cephalus	striped mullet	X	X	X
Scomberomorus maculatus	Spanish mackerel		X	
Sphoeroides nephelus	Southern puffer		X	
Mytilidae	Marine bivalves		X	
Brachidontes exustus	scorched mussel		X	
Brachidontes modiolus	yellow mussel		X	
Geukensia demissa	ribbed mussel		X	
Ischadium recurvum	hooked mussel		X	
Crassostrea virginica	Eastern oyster		X	
Unionidae	Freshwater bivalves	X		
Polinices sp.	Moon snail		X	
Busycon sinistrum	lightning whelk		X	
Olivella floralia	dwarf olive		X	
Melongena corona	Florida crown conch		X	
Viviparidae	freshwater gastropods	X		
Campeloma spp.	freshwater snails	X		
Campeloma decisum	pointed campeloma	X		

When comparing the invertebrates and the vertebrates, the invertebrates are overwhelmingly the dominant taxa. The invertebrates comprise 70.55 percent of the total analyzed assemblage, while the vertebrates make up the remaining 29.45 percent of the NISP. This difference is largely due to the large quantities of shell that came from Feature D-1. If we remove the NISP of the bivalves that were recovered from the 4.0 mm sieve and the 6.3 mm sieve, then percentages are reversed. The vertebrates constitute a higher percentage, 74.08 percent, and the invertebrates the remaining 25.92 percent. The invertebrates in this assemblage account for 15,830 elements. These elements are made up of bivalves, gastropods, and crustaceans, and the majority of that number comes from the bivalve fragments in Feature D-1.

The bivalves constitute 92.11 percent of the assemblage, gastropods 7.88 percent, and crustaceans 0.01 percent.

The majority of the invertebrates from Hunter's Camp is comprised of just three species. The Florida crown conch makes up the most represented number of individuals with 108. Terrestrial snail makes up the second highest number of individuals with 50, and the marine bivalve family (Mytilidae) makes up the third highest number of individuals with 38. The only Hunter's Camp feature that yielded data that could an idea as to function is Feature D-1. This feature likely was a shell midden due to the large numbers of bivalves present within this feature.

Palm Hammock

Like Hunter's Camp, the people of Palm Hammock exploited aquatic taxa almost to the near exclusion of terrestrial taxa. The NISP of the aquatic taxa is 1,480 and the NISP for the terrestrial taxa is 115. As with the Hunter's Camp taxa, the NISP values include elements and fragments identified to class, family, genus and/or species. The percentage of the aquatic taxa is 42.5 percent, while the percentage of the terrestrial taxa is only 3.3 percent. These percentages are derived from the taxa identified to class, family, genus and/or species and then divided by the total of the entire assemblage.

Birds, reptiles, amphibians, and fish, both cartilaginous and bony made up the vast majority of the assemblage of Palm Hammock. These elements and fragments totaled 2,804 elements of the collection, which is 80.6 percent of the total faunal assemblage. The mammals comprised only 160 elements, or 4.6 percent of the collection. The invertebrates comprised 148 elements, or 4.3 percent, of the total assemblage.

As at Hunter's Camp, turtles made up the majority of the vertebrate assemblage of Palm Hammock. Turtles comprised 58.3 percent of the assemblage, and the other vertebrates made up 26.8 percent of the assemblage. These numbers are almost identical to the numbers from Hunter's Camp. When you combine the two assemblages for an overall look at the taxa exploited, turtles comprised 61.5 percent of the assemblage, and the other vertebrates made up 34.8 percent of the assemblage.

As expected, the Palm Hammock assemblage consisted of aquatic taxa that lived in freshwater, brackish, and/or marine waters. The majority of the taxa live in freshwaters (85.48 percent). Marine taxa account for 11.95 percent, and taxa living in brackish waters account for just 2.57 percent. However, many of these taxa can be found in more than one environment, and in the case of marine fish, the juveniles are often found in brackish waters as well as freshwaters (Table 3.10).

Table 3.10: Species of Fresh, Marine, and/or Brackish Waters, Palm Hammock (8Br2509), Brevard County, Florida

Taxon	**Common Name**	**Freshwater**	**Marine**	**Brackish**
Chelydra serpentina	common snapping turtle	X		
Cheloniidae	Sea Turtles		X	
Kinosternon spp.	Mud Turtles	X		
Kinosternon baurii	Striped mud turtle	X		
Kinosternon subrubrum	Eastern mud turtle	X		
Sternotherus odoratus	Stinkpot	X		
Chrysemys sp.	painted turtles	X		
Deirochelys reticularia	chicken turtle	X		
Malaclemys terrapin	Diamondback terrapin	X	X	X
Pseudemys nelsoni	Florida red-bellied cooter	X		
Trachemys scripta	pond slider	X		
Apalone ferox	Florida soft-shelled turtle	X		

Table 3.10: Cont.'d

Taxon	Common Name	Freshwater	Marine	Brackish
Siren lacertina	greater siren	X		
Chondrichthyes	cartilaginous fishes		X	X
Lepisosteus osseus	longnose gar	X		
Amia calva	bowfin	X		
Ictalurus spp.	Freshwater catfish	X		
Ictalurus punctatus	channel catfish	X		
Ariopsis felis	hardhead catfish		X	X
Bagre marinus	Gafftopsail catfish		X	
Centropomus undecimalis	common snook		X	
Epinephelus spp.	Groupers		X	
Caranx hippos	Crevalle Jack		X	
Chloroscombrus chrysurus	Atlantic bumper		X	
Coryphaena hippurus	Mahi Mahi		X	
Lutjanus spp.	Snappers	X	X	X
Lutjanus griseus	gray snapper	X	X	X
Cynoscion nebulosus	spotted seatrout		X	X
Menticirrhus americanus	Southern kingfish		X	
*Bairdiella sanctaelucia*e	striped croaker		X	
Mugil cephalus	striped mullet	X	X	X
Scomberomorus maculatus	Spanish mackerel		X	
Sphoeroides spp.	puffer		X	
Mytilidae	Marine bivalves		X	
Brachidontes modiolus	yellow mussel		X	
Neverita duplicata	Shark eye		X	
Busycon spp.	Whelks		X	
Olivella spp.	Olive shells		X	
Olivella floralia	dwarf olive		X	
Melongena corona	Florida crown conch		X	
Campeloma spp.	freshwater snails	X		
Campeloma decisum	pointed campeloma	X		
Planorbella spp.	Ram's horn snails	X		
Planorbella duryi	Seminole Ram's Horn	X		
Planorbella scalaris	Mesa Ram's Horn	X		
Pomacea paludosa	Florida Apple Snail	X		

Comparison of the Two Sites

In order to draw conclusions about the sites, comparisons were made of species diversity and equitability from the two sites. In addition to these comparisons, chi-square calculations were made in order to determine any correlations between the two sites. These comparisons are made between the aquatic environments, the aquatic and terrestrial fauna, and turtle taxa and other vertebrates, and mammals and other vertebrates.

Hunter’s Camp has low species diversity and low species equitability based on the MNI of the identified taxa, suggesting that only a few species were being utilized. These values were calculated using the MNI for the identified genus and/or species. Based upon values calculated using the Shannon-Weaver Index, H' (diversity) =0.3912 and V' (equitability) =0.0928 (Reitz and Wing 2008). The H' value indicates that the site is of a moderate species diversity and s=70, where S equals the total number of identified taxa. The V' value indicates that the site has a low species equitability with only 5 dominant taxa. The diversity and equitability were only calculated for species that had been identified to Genus and/or species.

The species diversity and equitability were then calculated for all of the invertebrates and vertebrates using the NISP values. The diversity value of H' =0.154, signifies that based off of this information, the species diversity is low. This occurred due to the large number of bivalves present within the site. The equitability value of V' = 0.033, signifies that the equitability is low as well, and again, this is due to the high volume of bivalves present within the site (Table 3.11). The high NISP values of the bivalves indicate that these are the dominant taxa in this assemblage.

Table 3.11: Species Diversity and Equitability, Hunter's Camp (8Br2508), Brevard County, Florida

Combined Vertebrates and Invertebrates	**H'**	**V'**	**Log s**
NISP	0.154	0.033	4.654
Identified Taxa Only	**H'**	**V'**	**Log s**
MNI	0.3912	0.0928	4.2485

Palm Hammock also has low species diversity and low species equitability when these values were calculated using the MNI of identified taxa. Only those taxa that had been identified to genus and/or species were included in this first analysis. Again, based upon values calculated from the Shannon-Weaver Index, H' (diversity) = 0.6182 and V' (equitability) = 0.1410. The H' value indicates that the site is of a higher diversity than the Hunter's Camp site, however, the V' value indicates that the site still has low species equitability. There were 80 identified taxa in the Palm Hammock site, however, the assemblage was dominated by only six taxa.

The species diversity and equitability also were calculated based upon NISP values for all invertebrates and vertebrates. Utilizing these data, the H' = 1.4823 and the V' = 0.3129. These values indicate that the taxa are represented evenly, thus a higher diversity. The equitability is still low; however, the value is still higher than the Hunter's Camp site. Unlike the assemblage from Hunter's Camp, the Palm Hammock assemblage had relatively few invertebrate species. Turtles, bony fish, Florida soft-shelled turtle, and vertebrates in general dominated the Palm Hammock assemblage (Table 3.12).

Table 3.12: Species Diversity and Equitability, Palm Hammock (8Br2509), Brevard County, Florida

Combined Vertebrates and Invertebrates	**H'**	**V'**	**Log s**
NISP	1.4866	0.3133	4.7449
Identified Taxa Only	**H'**	**V'**	**Log s**
MNI	0.6302	0.1430	4.4067

For the purposes of this thesis, a comparison of the two faunal assemblages also was made in order to demonstrate the relationship between the two sites. To do this, a Chi-square test was performed. The greater the Chi-square value, in conjunction with a low p value, indicates that the values are dependent on each other. In each of the following tables (3.13 – 3.15), the first number is the observed value, the number in parentheses is the predicted value for that particular cell, and the number in brackets is the chi-square calculation for that particular cell. First, the aquatic taxa from both assemblages were compared to the terrestrial taxa in order to determine if the two sites were related (Table 3.13). In the case of the aquatic taxa and the terrestrial taxa, the chi-square value is 71.36. This value would suggest that there is a correlation between the two sites and the type of taxa utilized. By comparing the residuals between the data sets ($e=y-\hat{y}$), or the observed value minus the predicted value, it appears as though the aquatic taxa does not make up as much of the assemblage as one would expect at Palm Hammock. In contrast, the aquatic taxa do comprise much of the assemblage at Hunter's Camp. The inverse of this is true of the terrestrial taxa.

Table 3.13: Chi-square comparison of aquatic vs. terrestrial taxa

	Hunter's Camp	**Palm Hammock**
Aquatic Taxa	17837 (17777.62) [0.2]	1480 (1539.38) [2.29]
Terrestrial Taxa	583 (642.38) [5.49]	115 (55.62) [63.38]
Chi-square statistic	71.36	
P value	0	
Residuals	59.38 (Aquatic) -59.38 (Terrestrial)	-59.38 (Aquatic) 59.38 (Terrestrial)

The aquatic environments were tested utilizing chi-square because this thesis aimed to identify the importance of resources utilized from freshwater, brackish, and marine environments. The Chi square indicates that differences in freshwater, brackish and marine NISP counts differ between the Hunter's Camp and Palm Hammock sites. According to the chi-square analysis, there are more freshwater species present at Palm Hammock than at Hunter's Camp, and the reverse is true of the marine species (Table 3.14).

Table 3.14: Chi-square comparison of aquatic environments

	Hunter's Camp	Palm Hammock
Freshwater	528 (721.55) [51.92]	930 (736.45) [50.87]
Brackish	49 (38.11) [3.11]	28 (38.89) [3.05]
Marine	489 (306.34) [108.92]	130 (312.66) [106.71]
Chi-Square Value	324.5843	
P-Value	<0.00001	
Residuals	-193.55 (Freshwater) 10.89 (Brackish) 182.66 (Marine)	193.55 (Freshwater) -10.89 (Brackish) -182.66 (Marine)

Another comparison made between the two sites involved the utilization of turtles in comparison with all other vertebrate taxa. The presence of turtle at both sites was significantly higher than the rest of the other vertebrate taxa. The chi-square value in this comparison is significantly lower than the previous comparisons, which could indicate that the presence of the turtles was not necessarily related (Table 3.15). Based on the residual calculation, there were fewer turtles present at Hunter's Camp than at Palm Hammock. This is surprising due to the large numbers of aquatic taxa present at both sites.

Table 3.15: Chi-square comparison of Turtle taxa vs. all other vertebrats

	Hunter's Camp	**Palm Hammock**
Turtles	3849 (3987.14) [4.79]	2028 (1889.86) [10.1]
All other Vertebrate Taxa	2398 (2259.86) [8.44]	933 (1071.14) [17.82]
Chi-square statistic	41.1451	
P value	0	
Residuals	-138.14 (Turtles) 138.14 (all other vertebrates)	138.14 (Turtles) -138.14 (all other vertebrates)

In addition to the above, modified fragments of both shell and bone also were identified at both sites. Modifications of these fragments include drilled holes and smoothed edges of shell and burning, smoothing, and shaping of bone. These modifications suggest that they were utilized by the people of Hunter's Camp and Palm Hammock. These modified fragments will be discussed in greater detail in the next chapter of this thesis. Two species of shellfish were utilized in the modified elements, and these include the lightning whelk and the Florida crown conch.

There were two elements from Palm Hammock only identified as whelks that were also utilized in the modifications. Due to the fragmentation, the vertebrate fragments that exhibited signs of modification could only be identified as large mammal.

CHAPTER 4

DISCUSSION

In the following section, the results presented in the previous section will be discussed in greater detail. The main focus of this thesis include ascertaining the seasonality of the sites, the species diversity and equitability of the sites, and examining the faunal material exhibiting evidence of modification. By analyzing the aforementioned topics a much more complete assessment of the Palm Hammock and Hunter's Camp sites emerges.

Seasonality

In trying to ascertain a specific seasonality of the Fox Lake Sanctuary area, the nesting, breeding, and dormancy of species identified at Fox Lake was undertaken. The presence of elements identified as avian species that only winter throughout this area and the presence of certain reptile species, specifically the alligator and gopher tortoise at these locations often are used to determine the seasonality of a site. There is evidence from the faunal assemblages of both Hunter's Camp and Palm Hammock that would suggest a seasonal use of the Fox Lake Sanctuary, with winter and summer occupations likely. Faunal species at Hunter's Camp and Palm Hammock that indicate seasonality include: the pied-billed grebe, the canvasback duck, the mallard, blue-winged teal, the green-winged teal, the redhead, the gopher tortoise, and the alligator. Unfortunately, a limitation to this method of determining seasonality is that the presence or absence of certain species can only allow us to determine which seasons the site was occupied; they cannot be used to determine when the sites were not occupied.

Another method for determining seasons by shell growth could be applied. Studies by Quitmyer and Jones (1992), have utilized a modern sample of southern quahog, *Mercenaria campechiensis*, in determining the annual cycle of shell growth. Sections of these shells were taken in order to examine microstructural change because this change does not always correlate to the external growth rings present on the shell (Quitmyer and Jones 1992). Following the sectioning of the shell, cross-sections will appear dark (translucent) and light (opaque), and the presence of one translucent and one opaque increment represents one annual cycle of growth (Quitmyer and Jones 1992). These studies are important because the shell grows differently depending on the season. By comparing the findings from this modern assemblage with archaeological samples, determinations can be made as to the season that the shell was harvested, thus providing an accurate estimation of seasonality (Quitmyer and Jones 1992). While this is a fairly accurate method of ascertaining the seasonality, unfortunately, this method could not be utilized at Hunter's Camp or Palm Hammock because both sites lacked this type of clam.

As mentioned previously, several species of ducks and waterfowl use the Florida peninsula as their wintering range. The pied billed grebe normally breeds along the Alaskan coast from April to October; however, there are some breeding populations in the Caribbean, such as Bermuda and the West Indies, as well South America to central Chile and southern Argentina (Smith 2003). After the breeding season is over in October, the northern populations of the pied-billed grebe migrate to the Southern United States, as well as South America and the Caribbean (Smith 2003).

The canvasback, whose breeding season is from April to June, breeds in parts of the United States, including Colorado and Nevada north through British Columbia, Alberta, Saskatchewan, Manitoba, the Northwest Territories, the Yukon, and central Alaska (Dewey 2008). The winter range of the canvasback, after the breeding season, is from the coastal Pacific Northwest across central prairie states to the southern Great Lakes and south to Florida, Mexico, and Baja California (Dewey 2008). The breeding range for the mallard is much of the continental United States and Canada (Rogers 2001). The winter range of the mallard includes most of the southern United States, including southern Florida, Alabama, Mississippi, Louisiana, most of Texas, and southern New Mexico, Arizona, Nevada, and California (Rogers 2001). Both the blue-winged and green-winged teal also spend the winter months in Florida. The breeding range for both of these birds includes much of Canada and Alaska (Mingo 2008). While the green-winged teal has been spotted throughout the southern states, the blue-winged teal is much more confined in its winter range. The blue-winged teal spends much of its time throughout the state of Florida as well as the coastal regions of North and South Carolina, Georgia, Alabama, and Mississippi (Mingo 2008). The final avian species that points to a winter occupation of the site is the redhead. The redhead's breeding grounds is through the Prairie Pothole region of the northern Great Plains of North America as well as much of the Canadian Rockies, however, its winter range is throughout much of the rest of the continental United States and Mexico (Hoak 2003). With the winter ranges of these birds extending down into Florida and their breeding ranges not extending into Florida, the sites together demonstrate a marked seasonality.

Further, the presence of the gopher tortoise in the overall assemblage points to a likely summer occupation of the sites. During winter weather, the gopher tortoise tends to burrow down into the ground (Wing and McKean 1987). The burrows that the gopher tortoise constructs can be up to three meters deep and twelve meters long (Axley 1999). However, if the people of Hunter's Camp and Palm Hammock understood the behaviors of the animals, then they might have known of this behavior and therefore, would have been able to dig the tortoises out.

The American alligator is not often found in the winter months (Wing and McKean 1987). The alligator does not hibernate; however, they do go through periods of dormancy when the weather gets cold (Schechter and Street 2000). The alligator will also excavate caves in waterways and leave a portion of it above the water during the winter months (Schechter and Street 2000). In an area where the water level fluctuates, the alligator will dig itself into a hollow of mud which can then fill with water. In these cases, the tunnels are often up to 65 feet long, and they will provide protection during periods of extreme heat or cold (Schechter and Street 2000).

The presence of these species at both sites suggests a summer and winter occupation. The pied-billed grebe, canvasback duck, the mallard, the blue-winged teal, the green-winged teal, and the redhead would suggest a winter occupation of the sites due to the fact that they typically travel as far south as Florida only after the breeding seasons are over October. The presence of the gopher tortoise could suggest a summer occupation since they are often in burrows during the winter. The final animal that would show a marked seasonality is the alligator because during winter months, the alligator has a tendency to go dormant.

Species Diversity and Equitability

The utilization of the MNI numbers in assessing species diversity and equitability will likely lend a more accurate analysis than using the NISP values alone. R. Lee Lyman (2008) states that the MNI is less likely to be affected by differential fragmentation. This fragmentation will increase the NISP of an assemblage, thus affecting the species diversity and equitability.

Lyman (2008) also states that NISP is affected by recovery and collection methods, meaning that if an excavation is only utilizing a 1/4-inch screen then there will be a bias towards the larger animals. In contrast, if the excavation utilizes smaller screens, then the recovery will be greater, thus leading to a greater NISP. Utilizing the MNI values, the Hunter's Camp sites exhibits low species diversity and low equitability. In contrast, Palm Hammock has greater species diversity. This could be in part due to the smaller faunal assemblage of Palm Hammock, but it also could indicate that the Palm Hammock site was used as a processing site. The use of the both the Hunter's Camp and Palm Hammock sites will be discussed in greater detail later in this chapter.

Modification of Elements

Throughout Florida, various types of shell, including marine and freshwater bivalves and gastropods, preserve evidence of modification related to their transformation into or use as cutting tools, adzes, gouges, celts, and hoes. Ornamental modification of shell also occurs, usually in the form of beads or masks. Modifications also appear on bone, and in the case of Hunter's Camp and Palm Hammock, mammal bone was the bone most utilized for modification. The presence of modified bone and shell, in conjunction with lithics and pottery, indicates the presence of an occupation site in the case of Hunter's Camp and a processing site in the case of Palm Hammock.

Modified Shell

There are two species of gastropods present in the Hunter's Camp assemblage that exhibit signs of modification. These species are the lightning whelk (*Busycon sinistrum*) and the Florida crown conch (*Melongena corona*). The majority of the larger gastropods, such as the lightning whelk, are used as a variety of tools which most often include: cutting edge tools, adzes, gouges, and celts (Reiger 1979; Marquardt 1992; O'Day and Keegan 2001).

There was only one lightning whelk element found at the Hunter's Camp site, and it exhibited signs of modification. The whelk has scrape marks on the outer surface and one edge and the top edge had been smoothed. The scrape marks present on the shell appear perpendicular to the edge of the shell; the weathering present on the shell appears as parallel lines relative to the edge of the shell (Tanya Peres, personal communication 2012). One possibility for the lightning whelk fragment is that it could have been used as a hoe or a gouge. If it functioned as a hoe or gouge, then the columella fragment (or central portion of the shell) has likely broken off, but this cannot be determined conclusively. There also are scrape marks along the outside of the whorl fragment (Figure 4.1). Based on the criteria by O'Day and Keegan (2001), the lightning whelk from Hunter's Camp could be considered an expedient tool. O'Day and Keegan state that an expedient tool will often show signs of use wear (O'Day and Keegan 2001). The expedient tool will show only primary modification in which a portion of the source material is removed and shaped; however, there is no specific evidence for preparation of a work edge (O'Day and Keegan 2001). Despite the lack of evidence of a secondary modification, expedient tools were intentionally created (O'Day and Keegan 2001) (Figure 4.1).

It also is possible that this lightning whelk fragment might also have been used as a cutting-edged type of tool (Marquardt 1992). There are several types of cutting-edged tools that have been set by Marquardt (1992). The smoothed edge at the top could have been where the haft came out of the top of the shoulder, which Marquardt (1992) calls a Type E gastropod cutting-edged tool. A Type E gastropod cutting-edged tool is described by Marquardt as having perforations in the top of the shell, and these tools will not have a notch in the lip or a hole in the body whorl (Marquardt 1992). The smoothed edges which were described above could be from where the whelk was hafted onto some type of stick. One other possibility for the use of the lightning whelk fragment would be of an adze (Marquardt 1992) (Figure 4.2).

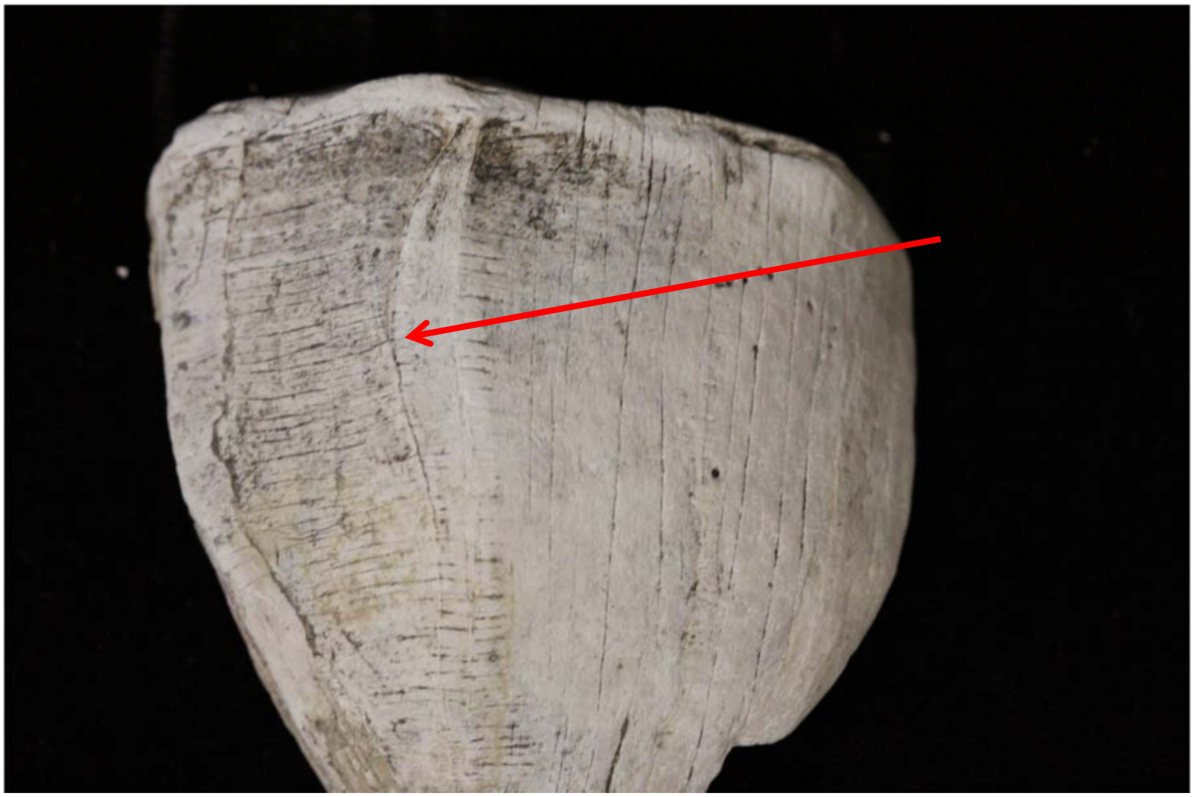

Figure 4.1: Hunter’s Camp Lightning whelk, *Busycon sinistrum*, with scrape marks – red arrow

Figure 4.2: Hunter’s Camp Lightning whelk with smoothed edge at the shoulder

The Florida crown conch occurred in great abundance in the Hunter’s Camp site. One of the complete specimens had a series of holes that had been cut into the shoulder and spire (Figure 4.3). The holes in the shell were likely used to get at the meat of the animal inside (Reiger 1979). In the cases of shell recovered from a site to the southeast of Chokoloskee and the Ten Thousand Islands, on the Gulf coast of Florida near the Everglades, a set of three perforated queen conch (*Strombus gigas*) were found within a meter of each other. The punctures in all the cases are crudely made, and the holes had simply been “pecked out,” and never rounded off (Reiger 1979:130). “The apertures, presumably, were a ‘preparation’ for a controlled cracking of the shell surface” (Reiger 1979:132). After the holes were punched out, the Native Americans would then connect them by breaking out the space in between (Reiger 1979). This seems to be the case with this particular shell from Hunter's Camp (Figure 4.3).

Figure 4.3: Hunter's Camp Florida crown conch, *Melongena corona*, with three holes cut into the side

Interestingly, with the high number of columellae present in this assemblage, it is additionally possible that the people of Hunter's Camp were using the columellae as a type of chisel (Penders 2005). The 19 elements that are both the columella and the body whorl, which initially were thought to be only fragments, might actually be a type of gouge. The tips of the columellae appear to have been worked meaning the edges of the shell have been shaped giving it a smoothed appearance. Gouges are shell tools that are the body whorl of the shell and the columella (O'Day and Keegan 2001). Another possibility for the columella and whorl fragment is a hoe, which are formed from the outer whorl and they retain the siphonal canal (O'Day and Keegan 2001).

There were only two *Busycon* sp. (whelk) fragments from the Palm Hammock site that exhibit signs of modification. The first was a body whorl fragment that was square in appearance with rounded corners and smoothed edges. A hole has been drilled through the shell, and there appears to be a line that could have been cording of some sort that went through this particular hole. There also appears to be a hole that was started, but was not punched through the shell. The final hole is on the edge of the artifact. There also appear to be two lines to the left and inferior of the hole that was not punched through (Figure 4.4). The appearance of these holes could indicate the shell was used as an ornament that could have been worn around the neck.

Figure 4.4: Modified *Busycon* sp. from Palm Hammock – front and back views; arrows indicate the holes

The other whelk fragment, a body whorl, appears to be either an adze or a celt. Marquardt (1992) states that a gastropod adze or celt is rectangular or trapezoidal in shape. In addition, the edges of the tool are rounded and smoothed, but the working edge of the tool will not be smoothed (Marquardt 1992). The element from Palm Hammock appears to follow Marquardt's description of a shell adze or celt. The element present in the Palm Hammock assemblage also appears to have the same scrape marks on the exterior edge as the Hunter's Camp tool. This element is complete, and the edge of the element exhibits signs of wear. Marquardt (1992) states that when attempting to distinguish between an adze and a celt, the working edge of the implement must be considered. If the implement has a unifacial working edge, then the element is an adze; in contrast, if the edge is bifacial, then the implement is a celt (Marquardt 1992). However, Marquardt cautions attempting to distinguish between the two when examining a *Busycon* spp. fragment (Marquardt 1992) (Figure 4.5 and 4.6).

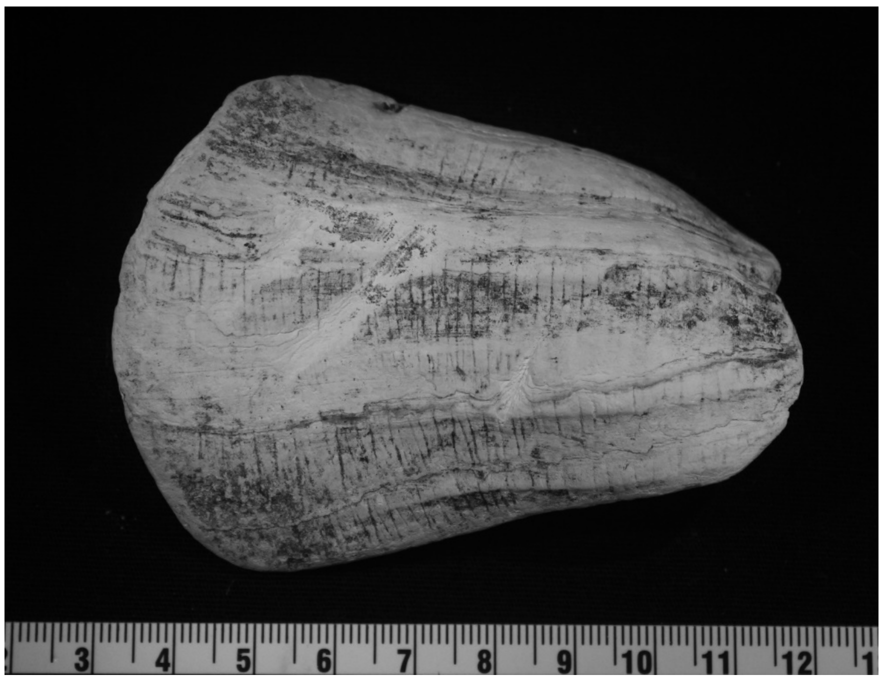

Figure 4.5: Modified *Busycon* sp. – possible adze/celt – Palm Hammock

Figure 4.6: Modified *Busycon* sp. – possible adze/celt – Palm Hammock

At Hunter's Camp, it is possible that the people were using nets because of the lightning whelk, *Busycon sinistrum,* fragment that was found at the site. The edges of the fragment have been smoothed which could suggest that it was dragged along the bottom of a waterway, suggesting a possible weight to a net. With the presence of the pond slider in the Hontoon Island assemblage, Wing and McKean (1987), suggest that people took advantage of the behavior of the pond turtle, and installed traps hanging on logs. Pond sliders will often bask on logs that are located in the water, and when they are disturbed, they will slide into the water. With the absence of archaeological evidence of traps, there is no way to know for sure if the people of Hunter's Camp and Palm Hammock were utilizing this method, but evidence does indicate that turtles were frequently caught (Wing and McKean 1987). Because the people at Hontoon Island had consistent success in catching pond turtles, Wing and McKean (1987) suggest that a technique such as a trap had been developed, and this technique was based on the behavior of the pond turtle. Wing and McKean (1987) discussed this possibility in their report on the Hontoon Island (8Vo202) faunal assemblage. Hontoon Island is located to the north of Hunter's Camp in Volusia County. They state in their report that a small piece of two-ply cordage had been found at Hontoon Island which could suggest netting material (Wing and McKean 1987). Wing and McKean (1987) also describe netting that was recovered from water logged deposits at Key Marco, and the cordage from Hontoon Island was similar to this material.

The lightning whelk fragment from Hunter's Camp as mentioned previously could have a variety of uses, including a net weight, a hoe (digging tool), a cutting-edged tool or an adze. In addition, the whelk fragment from Palm Hammock also could be either an adze or a celt. There is a possibility of this being a hoe despite agriculture not being present in this area at this time because it could have been used to dig out the tunnels that the gopher tortoise will burrow in during periods of extreme heat or cold. According to Marquardt's shell tool analyses, the lightning whelk fragment could also be a Type E gastropod cutting-edged tool (Marquardt 1992). Another possibility is that the lightning whelk fragment was used as an adze. Adzes are used for wood-working and based off Marquardt's shell analyses, the lightning whelk fragment could be a shouldered gastropod adze blank. Marquardt (1992) indicates that the shoulder from this gastropod is present in this type of blank. The adze is often rounded around the top and edges of the tool and left unworked around the working surface of the tool which is similar to how this whelk fragment appears. If the Hunter's Camp whelk fragment and the Palm Hammock whelk fragment are adzes, this could suggest the possibility of wood-working implements used in the carving of dugout canoes. Cypress chips were common at Hontoon Island, and these were common after adzing out the dugout canoe (Milanich 1994). Without more of the shell present from the Hunter’s Camp and Palm Hammock examples, it is impossible to tell which type of tool this one would be categorized as.

Modified Bone

In addition to the above modified shell, there also were a total of 14 bone fragments Hunter’s Camp that showed some type of modification. There were no elements of modified bone identified at Palm Hammock. Thirteen of these fragments were identified as large mammals, with one fragment being positively identified as gar. Five of the large mammal fragments could only be identified as bone splinters. Of these five, three could be refit together in order to form a complete tool (Figure 4.7). One of the five fragments also mended to the metatarsal fragment that was identified at Hunter’s Camp (Figure 4.8). Despite the identification of modified fragments within the Hunter’s Camp site, an assessment of function could not be determined. In many cases, the term “bone pin” will be utilized to describe both form and function. However, these terms are often utilized in order to describe the form of the tool as opposed to implying any specific function as we are often not able to determine any sort of function unless the tool has been fashioned into a relatively easily identifiable form, such as an awl or a “culturally modified fishhook” (Peres 2010:114).

Figure 4.7: Large mammal bone splinters that refit to one bone tool – Hunter's Camp

Figure 4.8: Large modified mammal metatarsal – 2 pieces refit to 1; Hunter's Camp

In addition, there were six proximal metapodial fragments that were identified from Hunter's Camp as well. A gar dentary was identified that may have exhibited signs of modification. The three bone splinters of large mammal that mended together showed signs of polishing as well as evidence of burning. The proximal metatarsal fragments have been polished and smoothed. One of the bone splinters of the large mammal had been rounded at the end and it had been burned post breakage (Figure 4.9).

Figure 4.9: Large mammal bone splinter rounded and burned – Hunter's Camp

Comparisons with Other Sites

In order to ascertain whether the Hunter's Camp and Palm Hammock sites were processing or habitation sites with seasonal occupations, possibly used to process bivalves, turtles, and fish, or as ceremonial/feasting sites, a comparison with Gauthier (8Br193), Dead Bird Island (8Br247), Edgewater Landing (8Vo115B), Castle Windy (8Vo00112), Zaremba (8Ir56) and Twin Mounds (8Or459) were undertaken. During the early Malabar Period, the people at the Gauthier Site (8Br193) and Dead Bird Island (8Br247) were fishing for smaller species of fish (Russo 1988). However, at the Gauthier Site, a temporal shift moves the emphasis of the subsistence to the collection of aquatic turtles, waterfowl, and large fish (Russo 1988). In the early Malabar Period, Russo (1988) suggests that mass capture techniques were used due to the small size of the fish, but that individual capture techniques also may have been used. In the later Malabar, Russo (1988) states that the people of the Gauthier site employed individual capture techniques, such as hooks and gigs. Russo also states that this change in fishing strategy should not be seen as a temporal shift (Russo 1988). However, this shift could have occurred due to a change in the site function from a residence to that of a temporary camp (Russo 1988).

Another site in close proximity to Hunter's Camp and Palm Hammock is Edgewater Landing (8Vo115B). The faunal assemblage from Edgewater Landing was analyzed from three different phases of excavation. Overall, there were very few faunal samples recovered from any of the phases (Russo et al. 1989). During the Phase II investigations, faunal samples containing large fish, mammals, birds, and reptiles were identified, and this sample would suggest that there was a shift towards larger fauna as a mode of subsistence (Russo et al. 1989). This discrepancy in recovery likely lies with the fact that the Phase II investigations relied on 1/4 inch screen, which will bias a sample toward larger animals and larger fish, thus excluding the smaller fish remains (Wing and Quitmyer 1985). At the Edgewater Landing site, shellfish, the dominant taxa, were not included in the initial analysis, which then inflated the importance of non-shellfish species (Russo et al. 1989). The remains of large mammals, such as deer and other large vertebrates, as well as large fish were recovered during the Phase III excavations, but, according to Russo et al. (1989), these were always rare in terms of their frequency. In contrast, there were large amounts of oysters, clams, and tagelus, small marine fishes, marine vertebrates, and terrestrial vertebrates, as well as other shellfish that were the primary focus of the collection at Edgewater Landing (Russo et al. 1989). Russo et al. (1989) state that the seasonal analysis of the site indicates that it was occupied at one time or another during all parts of the year. In order to come to this conclusion regarding seasonality, Russo et al. (1989) indicate that fine mesh recovery is imperative. This recovery method allows for a recovery of *Boonea* sp., a parasitic snail that feeds almost exclusively on oyster and lives for only one year (Russo et al. 1989). These *Boonea* sp. will continue to grow throughout the year and then they will abruptly die off in late spring. If these snails are present in an assemblage, a measurement of the size of these snails then can be used to predict the time of year the oysters would have been collected (Russo et al. 1989). In addition to the identification of these snails, another method of seasonality analysis included measuring the growth rings of the quahogs identified at the site (Russo et al. 1989).

The other Volusia County site in close proximity to Hunter's Camp and Palm Hammock is the Castle Windy midden site (8Vo00112). The site was excavated in 1956 and 1957 by Bullen and Sleight, is characterized by St. Johns check stamped pottery. The site is located 12 miles southeast of New Smyrna Beach, on the western side of the island separating Mosquito Lagoon from the Atlantic Ocean (Bullen and Sleight 1959). According to Bullen and Sleight, shellfish comprised the main component of the diet, with the dominant taxa being oyster and clam (Bullen and Sleight 1959). Bullen and Sleight (1959) came to the conclusion that the occupation of the Castle Windy site occurred during the winter months. This conclusion, based upon the presence of oyster, clam, and mullet (a marine fish). The presence of these taxa also suggests that the site was also a special use site in the processing of these taxa.

The Zaremba Site (8Ir56), a Malabar II site, is located on a dune ridge that is adjacent to the Atlantic, and the Indian River is 1.2 km west of the site (Russo 1988). The Zaremba Site is considered to be a short-term occupation site. The majority of the subsistence of this site came from the harvesting of the eastern oyster (*Crassostrea virginica*) (Russo 1988). Russo (1988) states that there was a warm weather occupation of the site, but the site is not necessarily a "seasonal" camp.

The final site utilized for comparison is the Twin Mounds site (8Or459) located in Orange County. The processing of this site is conducive to a relatively complete assessment of the fauna from this location. I. R. Quitmyer led excavations of this site, and this included a 50 x 50 cm column sample excavated in natural stratigraphic units down to the culturally sterile substrate (Quitmyer 2005). This column sample was then water screened through nested 1/4", 1/8", and 1/16" screen. This method allows for a relatively complete assessment of the site without the biases often encountered in assemblages only processed through 1/4" and 1/8". The Twin Mounds site also dates to the Malabar II period, and like the other sites in this comparison, the taxa of the Twin Mounds site largely included gastropods and fish (Quitmyer 2005). Quitmyer (2005) also posits that many of the smaller species of fish, as well as bowfin, gar, and freshwater catfish, could be caught with the use of nets or traps, and the presence of these species indicates the utilization of species present in a river bottom habitat. Quitmyer discusses the likelihood of the site being occupied year-round. Finally, Quitmyer indicates that the main subsistence resources for the Twin Mounds site are gastropods and bivalves, with bony fish and aquatic reptiles being a secondary resource (Quitmyer 2005).

Based upon the comparisons above, I propose that the Hunter's Camp Site was likely the main occupation site of the Fox Lake Sanctuary, and the Palm Hammock site likely was utilized as a processing site of fish and turtles. As mentioned above, the Gauthier Site shifted to the collection of aquatic turtles, waterfowl, and larger fish (Russo 1988). It is possible that is what occurred at the Hunter's Camp site as well due to the large amounts of turtle present at the site. In addition to being the main occupation area of the site, the Hunter's Camp site was also likely a processing site of bivalves. Coincidentally, there is almost a complete lack of bivalves at the Palm Hammock site; however, there is still a substantial amount of turtle and cranial elements of fish. There was a single feature from Hunter's Camp, Feature D-1, which was almost completely comprised of bivalve fragments. One possibility is that the people of Hunter's Camp were breaking these shells open in order to get at the meat inside. However, due to the highly fragmented state of the shell, it is impossible to tell which species these were, and how much meat would be inside the shell. There were 121 burned fragments that were observed within this feature, and it is possible that the bivalves were roasted before they were broken open. There were likely more fragments that showed evidence of burning, but because this feature was separated with the geologic nesting sieves, many of the fragments exhibiting signs of burning in the 2.0 mm and the <2.0 mm likely were missed.

Utilization of Species

There were a few species identified at Hunter's Camp that seemed to be utilized more than others. These include: soft-shell turtle, gopher tortoise, stinkpot, various mud turtles, including the common mud turtle and the striped mud turtle, white-tailed deer, alligator, gray snapper, and gar. There were 157 elements of soft-shell turtle identified, but due to the large numbers of indeterminate fragments, the MNI could only be identified to two. There were also 115 elements of alligator, in which 48 of those showed signs of being burned. There were also 130 elements of gar that were identified, though the majority of these were vertebrae. There were 66 elements identified to the stinkpot (S*ternotherus odoratus*), which is unusual for two reasons. One reason is that the stinkpot is a fairly small turtle with relatively little edible meat, and the other is that when disturbed, the musk turtle will release a foul-smelling liquid from its musk glands (Stabler 2000). However, the shape of their shells makes them ideal for use as a bowl which could explain the number of burned stinkpot shell fragments.

Unlike Hunter's Camp, there is not a clear dominant species in the Palm Hammock assemblage. Though the below discussed species were the most identified, none of these dominated the assemblage as the Florida Crown Conch did in the Hunter's Camp assemblage. The Mesa Ram's Horn, the striped and Eastern mud turtles, the stinkpot, the Eastern box turtle, the Florida soft-shelled turtle, and the freshwater catfishes comprise the majority of the MNI of this site. The NISP and MNI of the Mesa Ram's Horn is 15. The striped and Eastern mud turtles comprised 172 of the NISP and 18 of the MNI. The Eastern box turtle comprised 49 of the NISP and seven of the MNI, while the Florida soft-shelled turtle comprised 260 of the NISP, but they only made up four of the MNI. The final species, the freshwater catfishes, comprised 32 of the NISP and eight of the MNI.

Processing Site

A careful consideration supports the use of the Palm Hammock site as a processing site. The presence of more fish cranial fragments at Palm Hammock could suggest that this site was utilized as a fish processing site, though the presence of other fauna also would suggest that those species were processed on site as well. The idea that Palm Hammock was considered a processing site will be discussed in more detail below. The Palm Hammock site was comprised of 620 elements and fragments identified as fish. In contrast to the Hunter's Camp site, 183 of these elements were identified as cranial elements, with the remainder identified as post-cranial fragments. The percentage of these cranial elements is much greater than that of Hunter's Camp, with approximately 30 percent identified cranial elements at Palm Hammock as opposed to 12 percent identified cranial elements at Hunter's Camp. This difference of the percentages could point to Palm Hammock being more of a processing site for fish.

Hunter's Camp is most likely a main occupation and consumption site. Though, the presence of only two otoliths at Hunter's Camp also is interesting to note. Both of these otoliths, one of which shows evidence of burning, came from the hardhead catfish. Otoliths are earstones that are found in the inner ears of fishes, and they function to aid in hearing and equilibrium (Reitz and Wing 2008). It is interesting because despite the large numbers of fish elements recovered at the site, the presence of only two otoliths could suggest that the heads of the fish were being removed elsewhere. It is also possible that they were bringing the complete fish back and removing the heads there, and the recovery methods, specifically the screen sizes, did not allow these otoliths to be recovered. Wing and Quitmyer (1985) stress the importance of utilizing smaller screen sizes – 1/8 – 1/16-inch in order to recover faunal material. Only utilizing the standard 1/4" screen size allows for a bias towards larger animals, thus a complete picture of the subsistence patterns and other faunal uses is not easily discerned. In smaller fish, the otoliths would be small, and would either go through the screen. Or, another possibility for their scarcity is that they were not recognized in the field and were simply looked over because they resemble rocks. Based upon the comparison of the cranial elements versus the post-cranial elements (namely the vertebrae, dorsal and pectoral spines, and the scales of the gar), the people were likely removing their heads before bringing them back to the site.

The Hunter's Camp site was comprised of 1,600 fragments identified as fish, and 1,423 of these fragments were identified as post-cranial while 177 fragments were identified as cranial elements. Further research into one of the sites of the Fox Lake Sanctuary, Xavier's Knoll (8BR2510), also located at the Fox Lake Sanctuary demonstrates the exact opposite. While analysis is not complete, the presence of a large number of cranial elements and relatively few post-cranial elements suggest that the fish were likely being processed at Xavier's Knoll.

Feasting Activity

There is also evidence for the possibility of feasting at the Hunter's Camp site. The presence of species considered to be rare and possibly difficult to obtain could indicate that these species were utilized in feasting episodes. In addition, the abundance of a particular species also could be indicative of feasting activity, which occurred at Hunter's Camp in the form of the Florida crown conch as well as the numerous bivalves. In addition, white-tailed deer remains also were found at the site, with 23 elements identified. Of the 23 elements found, seven of these elements showed signs of being heat altered. Further, a right calcaneus, showed evidence of being burned as well as being modified. This calcaneus showed evidence of cut marks on the lateral side, and it also appeared as if a portion had been shaved off. A distal end of a middle phalanx also showed evidence of burning as well as polishing. Of the mammals identified to genus and/or species, the deer had the highest NISP, though mammals make up so little of the assemblage. It is possible that deer was used as a ceremonial food. Conversely, it also is possible that deer simply were a rare species in this area. Russo (1989) states that at the Edgewater Landing Site deer is considered rare, and it would a low meat contribution to the diet of people from Edgewater Landing. Deer was also present at the Palm Hammock site, with 24 elements identified. Two of the elements exhibited evidence of cut-marks. Like Hunter's Camp, white-tailed deer had the highest NISP of the mammals identified to genus and/or species. Also, Interesting to note, the Hunter's Camp assemblage yielded just one fragment from the Northern river otter, while the Palm Hammock assemblage yielded five fragments of the river otter. The Northern river otter was represented in both assemblages by mandibles, molars, and canines.

In addition, the above analysis suggests that the people of both Hunter's Camp and Palm Hammock were utilizing species that were available in all types of water sources from freshwater to brackish to saltwater. The presence of several species of fish that only exist in the Atlantic Ocean suggest that the people were traveling to the coast, approximately 20 miles/32.19 km due east from the site, in order to bring back food products. In order to get to the coast, the people of these sites would also have to cross both the Indian River and the Indian River Lagoon. One of those species that occurs in great abundance in the Hunter's Camp assemblage is the Florida crown conch. With an NISP of 269 and an MNI of 108, the Florida crown conch was a species important to the people of Hunter's Camp. The mature crown conch generally occupies the intertidal zone. They inhabit low-energy embayments, salt marshes, mangrove swamps, and lagoons (Hayes 2003). Hayes (2003) notes that they are noticeably absent from high-energy beaches that are exposed to wave action. Crown conchs are typically found in low wave energy areas that have a high depositional rate in which the conchs can feed or scavenge for food (Hayes 2003). Adult crown conchs can survive in areas where the salinity is 8 parts per thousand (ppt), which is the salinity of brackish water, but in order to carry out normal functions, the conch needs to be in water with a salinity of 25-30 ppt, which is the salinity of seawater (Hayes 2003).

With the large numbers of crown conch present in the Hunter's Camp assemblage and the numbers of species of fish that are only available in saltwater, one would have to ask the question, are the marine species possibly being used as a feasting food? Some of the strictly marine species identified in the Hunter's Camp assemblage include: Gafftopsail catfish, blue runner, Jack Crevalle, loggerhead sea turtle, common snook, Eastern oyster, spotted seatrout, ribbed mussel, scorched mussel, yellow mussel, lightning whelk, hooked mussel, Southern kingfish, dwarf olive shell, Spanish mackerel, sheepshead and Southern puffer. Several species in the Palm Hammock assemblage identified as strictly marine species include: Gafftopsail catfish, common snook, groupers, Jack Crevalle, Atlantic bumper, mahi mahi, Southern kingfish, striped croaker, Spanish mackerel, yellow mussel, Shark eye, and dwarf olive shell. It is interesting that the site occupants traveled to collect marine species when there are numerous locally available species of freshwater and brackish taxa.

The marine resource procurement would require more than a day's walk. Currently, the Atlantic Ocean is roughly 20 miles from the Fox Lake Area (Milanich 1994). The presence of these marine species could indicate feasting episodes. Due to the abundance of freshwater and brackish species, there would not be a need for the marine species from the Atlantic Ocean. If the Atlantic Ocean were a little bit closer, then it might be a possibility to utilize these marine species every day. Eighty five percent of the Palm Hammock fish assemblage was comprised of elements from fish native to freshwaters. In contrast, Hunter's Camp freshwater fish only comprised 42 percent. However, in terms of the marine species, these percentages were reversed; Palm Hammock's marine fishes comprised 12 percent of the total fish assemblage, and Hunter's Camp's marine fishes comprised 52 percent of the total fish assemblage.

Another argument that supports the possibility of ceremonial use of the marine species listed above is if these marine species were a part of everyday life then there would be more found in the assemblages than what is currently present. If canoes were present at Hontoon Island, then it is likely that they also were present at Hunter's Camp and Palm Hammock, and therefore the 20 mile distance to the coast easily could be completed in just a few hours. Even if this trip could be completed in a few hours, there is still a significant energy output required to get to the coast. The expenditure of calories and energy would need to be justified which would entail bringing back significant amounts of resources. The utilization of several marine species could in fact point to a ceremonial use of these species.

Discussion of the Two Sites

One of the objectives of this research was to determine the subsistence strategies of Hunter's Camp and Palm Hammock. In order to do this, the faunal assemblage was examined and identified. Upon completion of these identifications, percentages were calculated to assess how much a particular species was utilized. Russo, as stated in Milanich (1994), indicates reptiles and fish accounted for nearly 80 percent of the diet, and terrestrial animals accounted for 14 percent of the diet of the Malabar people at sites from the Indian River region. However, the percentages from both Hunter's Camp and Palm Hammock indicate a much higher dependence on reptiles and fish with 96.56 percent. The percentage from Palm Hammock does coincide with Russo's percentages at 80.60 percent. However, when the vertebrate counts of Hunter's Camp and Palm Hammock are combined, the percentage of reptiles and fish make up 92.4 percent of the analyzed vertebrates. Whereas the mammals, in contrast, make up only 3.8 percent of the assemblage which again is vastly different than the percentages proposed by Russo.

Chi square calculations in the previous chapter also support the proposition that Palm Hammock was a processing site and Hunter's Camp was a primary occupational site. Residuals calculated indicate that a greater number of freshwater fish, turtles, mammals, and shellfish were present at the Palm Hammock site, and there were fewer marine species present. In contrast, there were more marine fish, turtles, and shellfish present at Hunter's Camp which could be indicative of feasting episodes.

CHAPTER 5

SUMMARY AND CONCLUSIONS

For the purposes of this thesis, faunal assemblages from two Malabar Period sites in Brevard County, Florida were examined. Hunter's Camp and Palm Hammock were two sites examined within the Fox Lake Sanctuary. Lithics, botanicals, pottery, and faunal were examined from these sites in order to provide a better understanding of the people living in this area. Based upon the faunal assemblage, information regarding the seasonality, species diversity, and site use has been determined utilizing the species present. Statistics calculated using Chi-square indicated that the each of the variables tested were dependent on each other, and indicated that a correlation existed between the two sites. The two sites were likely related in that one served as a processing site (Palm Hammock) and one served as the main occupation site (Hunter's Camp). Analyses of the faunal assemblages indicate that both the Hunter's Camp and Palm Hammock sites experienced summer and winter occupations. This is evidenced by the presence of the pied-billed grebe, canvasback duck, mallard, blue and green-winged teal, redhead, and alligator in the assemblage. Species diversity and equitability calculations via the Shannon-Weaver Index demonstrated that Palm Hammock had a higher species diversity than Hunter's Camp, and both sites demonstrated a low species equitability. Based on the information gathered from faunal analyses at these sites, it is likely that the Hunter's Camp site was the main occupation site and the Palm Hammock site was a fish processing site. The argument for a ceremonial/feasting episode also can be made based upon the taxa of marine species that were found there. The argument for Palm Hammock being a special use site is based upon a comparison with the faunal assemblages with other sites in relatively close proximity. The large numbers of bivalves present at the Hunter's Camp site suggests that they were processed there, and this is certainly plausible due to the low energy expenditure needed to process these bivalves. The large amount of Florida crown conch present at Hunter's Camp, a species that is found in marine waters, also could suggest a feasting episode or a ceremonial episode. The people of Hunter's Camp and Palm Hammock utilized species available to them. In addition to the subsistence practices, the people utilized parts of the animals for tool or ornamental use. There are two other multi-component sites, Xavier's Knoll and Knight's Rise at the Fox Lake Sanctuary, and the analyses are ongoing at these sites. I am confident that upon the completion of these analyses, the data will indicate that there was a greater utilization of aquatic resources than previously stated by Milanich for Indian River sites during the Malabar Period. The greater utilization of aquatic resources at the Hunter's Camp and Palm Hammock sites illustrates the importance of carefully analyzing and comparing sites in the region to better understand the complex use patterns.

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