For the birds
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Abstract of Thesis Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Master of Arts

WHEN THE OCEAN MEETS THE SKY: AN ANALYSIS OF AVIAN REMAINS FROM A CIVIC-CEREMONIAL CENTER ON THE FLORIDA GULF COAST

By

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Recent excavations at Shell Mound (8LV42), a civic-ceremonial center on the northern Gulf Coast of Florida, have revealed many pit features with vertebrate faunal remains. One such feature, a large, silo-shaped pit yielded a proportionately large number of skeletal elements identified to several species of waterbirds, a trait unique among contemporaneous sites within the area. The archaeological record of pre-Columbian cultures of the North American Southeast demonstrates the ritual importance of birds in the form of effigy pipes, copper and mica cutouts, and mortuary vessels that extend well into and beyond the first millennium A.D. Given the spatial and temporal relationship of Shell Mound with a large mortuary facility (Palmetto Mound), and the relationship of the faunal contents with recurring iconographic characters of this time period, the fauna assemblage from Feature 25 should be expected to represent practices outside of everyday subsistence. Based upon the presence of juvenile white ibis elements, which offer a proxy for the timing of capture for this apparently ritually charged class of animal, this thesis proposes the presence of waterbird elements
recovered in this context represents ritualized deposition coinciding with events surrounding the summer solstice.
CHAPTER 1
INTRODUCTION

Birds factor prominently in the cosmologies of native North American peoples as evidenced in symbolic representation in numerous forms of media recovered from archaeological contexts spanning five to six millennia (Anderson and Sassaman 2012:140; Brown 2006; Claassen 2015:153-154; Crawford 2003; Hudson 1976:128-130; Pluckhahn 2010:62; Serjeantson 2009; Sunderhaus and Blosser 2006). Avian effigy beads of the Middle Archaic period; Poverty Point’s bird-shaped Mound A; platform pipes, copper cutouts, and pottery of the Woodland period; and various media depicting Cahokia’s so-called Bird Man are testament to the centrality of birds in Native American cosmology. Ironically, North American archaeofaunal assemblages are generally depauperate of bird remains. Of the assemblages that do contain bird, with some exception (e.g. Fischel 1997; Jackson and Scott 2003; Kelly and Kelly 2007), analyses often interpret the avian remains in terms of their contribution to subsistence without lending credence to the concept that these ritually charged animals may have been afforded special reverence which may have affected how humans interacted with them up to and including deposition.

While numerous studies have dealt with various media and imagery depicting bird forms, not much attention has been given to the ritual use of birds themselves, which in most archaeological contexts is traceable through bone alone. This thesis argues that ritual activity is the intersection of iconography and bony remains, using as a case study a civic-ceremonial center on the northern Gulf coast of Florida. How representations of birds in non-osseous media relate to the bony remains of birds found
in archaeological contexts is not well understood but has potential to inform on the relationship between structure and practice in a cultural milieu of heightened rituality.

Chapter 1 presents the problem I have attempted to address in this thesis by first introducing the site from where I drew my data. Shell Mound will then be situated within the regional history of Civic-Ceremonial centers and their rise on the Gulf Coastal plain after 200 A.D. Next, I introduce a brief overview of bird imagery in the context of the Middle and Late Woodland periods of the Southeast, before giving a short description of how the avian assemblage from Feature 25 at Shell Mound can provide answers to the question of how birds factored into ritual practices.

**Shell Mound**

Shell Mound (8LV42) fostered a period of occupation spanning the better part of the first millennium B.P. After 4,500 cal BP, when postglacial rising seas reached within 1 to 2 m of modern levels, coastal peoples in the greater Gulf coastal region experienced a period of relative stability as a new regime of marsh aggradation made possible the estuarine environment that exists today (Sassaman et al. 2017). This period of stability, however, was interrupted during punctuated changes in sea level, when climate change caused seas to rise faster than marshes could aggrade. During these periods shorelines were pushed inland some 2 to 3 kilometers. Evidence of site settlement, abandonment, and relocation in the region suggests that the subsistence economies, focused largely on the exploitation of marine resources, were able to weather these punctuated events of resettlement (Sassaman et al. 2016).

After 200 A.D., following one such transgressive event, civic-ceremonial centers appeared on the northern Gulf coast as communities coalesced into more permanent
settlements. Whether this is seen as an outgrowth of the Hopewellian tradition of the Midwest, which is unclear save for the notable exception of Crystal River, or local variants of a greater religious movement, the development of these civic-ceremonial centers coincides with what appears to be a regionwide phenomenon of intensified rituality associated with mortuary practices oriented toward ancestor veneration (Anderson and Sassaman 2012:122-127). Unlike the earlier Hopewell mound complexes of the Midwest, these ceremonial civic-centers accommodated visitors as well as permanent inhabitants both living and deceased. A number of these mound centers have been documented in the region of the Southeast stretching from what is now southern Alabama and Georgia to the northern Gulf coast of Florida. Both inland centers such as Kolomoki and McKeithen, and those situated along the coast such as Crystal River and Garden Patch, feature mound construction in association with mortuary practices that involved communal feasting and the caching of ornate vessels ascribed to the Swift Creek and Weeden Island ceramic traditions (Anderson and Sassaman 2012:127; Milanich 1997; Pluckhahn 2003, 2010; Pluckhahn et al. 2015; Wallis et al. 2015).

As hunter-gatherers of the region coalesced into these various mound centers the subsistence-based economies of the previous millennia shifted to accommodate the needs of a ritual economy. Increased resource production was needed to provision the large groups that gathered for feasting and terraforming accompanying mortuary practices (Sassaman et al. 2017). Annual residents of civic-ceremonial centers would have been responsible for their own sustenance all the while ensuring the food and materials needed for periodic events were secured. Shell Mound (8LV42) rose as a
civic-ceremonial center ca. A.D. 500-600 after the height of mound building activity at nearby Gulf coastal centers Garden Patch and Crystal River had ceased. Evidence of intensive settlement and increased resource production can be seen in the volume of accumulated oyster shell and presence of large subterranean pits containing material culture and faunal remains indicative of large feasting events (Sassaman et al. 2017).

Situated along the coast between Crystal River to the south and Garden Patch to the north, Shell Mound features a “u” or “c” shaped mound constructed mostly of oyster shell situated on the end of a peninsula 500 meters across a shallow stretch of intertidal water from its associated cemetery, Palmetto Mound (Sassaman et al. 2017). Like Crystal River, Shell Mound was emplaced onto an existing mortuary landscape. Construction of Palmetto Mound preceded the first permanent occupation of the Shell Mound site by some 400 years but the relict dune on which it was built was receiving inhumations even earlier (Donop 2017; Sassaman et al. 2017). Gulf coast peoples had at least a 3,000-year-old history of moving cemeteries inland ahead of resettlement. It is likely that in the face of “uncertain futures” anticipating rising seas they relocated their ancestors inland from coastal cemeteries and reburied them in the elevated sands of relict parabolic dunes. As encroaching seas came to threaten their life ways at the water’s edge, settlement followed the ancestors to higher ground (Randall and Sassaman 2017; Sassaman 2016; Sassaman et al. 2017).

Like Palmetto Mound, Shell Mound was constructed over an existing dune formation. At around A.D. 200 the first permanent residents of Shell Mound inhabited the lower elevations of the peninsular landform, possibly cut off from Palmetto Mound to the West by the overstep event of the prior century. Occupation of the peninsula had
moved upward on the dune ridge by A.D. 400 and intensified in the ensuing century as
evidenced by the digging and infilling of large pits on the dune’s edge and the
placement of oyster on the ridge. By A.D. 650 accumulated oyster midden had been
mobilized to form the final configuration of Shell Mound and to construct Dennis Creek
Mound, a small conical mortuary mound situated 200 m to the northeast of Shell Mound
(Boucher 2017; Sassaman et al. 2017).

During the height of activity at Shell Mound, residents and visitors were involved
in projects that have been argued to be associated with mortuary practices taking place
at Palmetto Mound, 500 m to the West. It is estimated that up to 1.2 billion oysters went
into the construction of Shell Mound, and vertebrate faunal assemblages from several of
the large pit features that have been analyzed to date contain mullet, large jack and
drum, sea turtle, deer, and wading birds, among other species. This period of
intensification was necessary to meet the demands of a ritual economy (Sassaman et
al. 2017). Were a resident population occupying Shell Mound throughout the year, they
would have been charged with providing the materials used in ritual gathering taken part
by both themselves and coalescing visitors. This would have meant the coordinated
collection of animal resources from the areas surrounding Shell Mound and actively
manipulating the landscape to increase yields. Jessica Jenkins (2016) has provided
compelling evidence that many of the oysters that make up Shell Mound may have
been farmed through mariculture practices, and recent testing of an oyster berm on the
shores of nearby Richard’s Island suggests that it was constructed of reused midden to
create a tidally filled embayment which essentially would have functioned as a fish trap
for the collection of large numbers of schooling fish (Sassaman et al. 2016).
The digging and infilling of large pit features at Shell Mound are believed to represent discrete events and the faunal assemblage along with the ceramic assemblage from these contexts, which contain a number of large vessels with evidence of sooting, suggests that these pit features are the result of communal feasting (Sassaman et al. 2017). Evidence gleaned from the archaeological record of Shell Mound shows a history of people gathering routinely, perhaps to honor their ancestors directly across the water in Palmetto Mound. Before it was looted beginning in the late 19th century Palmetto Mound contained hundreds of pottery vessels among hundreds of human interments. What is known of the remains of that once prolific ceramic assemblage comes from Mark Donop’s (2017) analysis of vessels and vessel fragments now scattered throughout the collections of several institutions and a few private individuals.

**Bird Imagery**

Notable among the vessels inventoried by Donop (2017) from Palmetto Mound are the three-dimensional modelled effigy vessels depicting human and zoomorphic forms. Elaborate pottery featuring human and animal effigies is a hallmark of Middle and Late Woodland period mortuary practices, and caches of these vessels are not uncommon in mortuary mounds dating to this time period (Anderson and Sassaman 2012:127; Milanich et al. 1984; Pluckhahn 2003, 2010; Sears 1956; Steinen 2006). Palmetto Mound contains the most modelled effigy vessels and the highest number of human forms among Southeastern sites where these types of vessels are present (Donop 2017). Of the 22 nonhuman effigy vessels inventoried by Donop (2017) 17 depict bird forms, a total matched only by the combined assemblage of mounds D and
E at Kolomoki where the same number of bird effigies were recorded (Pluckhahn 2010:62). Thomas Pluckhahn (2010:62) has remarked on the preponderance of bird representations on nonhuman effigies from Kolomoki and related sites, noting that of 39 mound caches containing animal effigies throughout the region, 14 consist of bird representations alone.

Bird imagery in mortuary contexts has a deep history in North America. Wading, or water birds in particular have been associated with burials in the Maritime Archaic of the Northeast as well as the underwater burials at Windover in Florida, and they are prominent figures of Hopewell iconography, showing up in various media and widespread, with expressions reaching the continental edge of Hopewell-influenced cultures, on the Gulf coast of Florida (Bernardini and Carr 2004; Brown 2006; Carr 2004:586; Carr and Case 2004:203-208; Claassen 2015; Hall 1997; Hall 2006; Milanich et al. 1984:172; Pluckhahn 2003; Pluckhahn 2010; Steinen 2006; Sunderhaus and Blosser 2006; Weets et al. 2004). Regardless of whether the civic-ceremonial centers of the Gulf Coastal Plain and their attendant material cultural traditions represent an historical continuum from earlier Hopewell traditions, it is clear that bird iconography has ritual significance throughout the first millennium A.D.

The reasons for this emphasis have been speculated on in many works relating to Hopewell ritual and iconography. Sunderhaus and Blosser (2006:142) note that while birds are typically associated with the upper world in the Eastern Woodland three-tiered universe, “waterbirds, however, should… be considered as having special abilities given their ability to travel through all three tiers.” As these animals possess the ability to traverse worlds they are liminal creatures, existing in the air and the water, the upper
worlds and the underworlds. In Middle and Late Woodland mortuary practices, these animals’ liminal existence may have been metaphorical for the period during which a human body was placed in a charnel house for decomposition to occur before inhumation in a funerary mound (Milanich et al. 1984:167).

Other scholars have attributed bird motifs to shamans or ritual specialists. Pluckhahn (2010) has speculated that bird imagery in the Deep South during the Middle Woodland may be linked with ritual specialists who presided over mortuary ceremonies. A number of the humans depicted in Weeden Island modelled effigies feature birds in the form of accouterments or as part of headdresses (Pluckhahn 2010:62). Mound B at the McKeithen site was interpreted by Milanich et al. (1984) as the residence and later tomb of a ritual specialist who was found extended on their back with the tibiotarsus of an anhinga under their head, possibly as part of a headdress (Milanich et al. 1984:110). Nearby the burial were several ceramic plates with bird motifs, and buried less than a meter from the feet of this individual was a ceramic bird head (Milanich et al. 1984:108).

According to Brown (2006:482), Hopewell effigy pipes may reflect their use by ritual specialists who called upon animal tutelaries to guide them through hallucinations. The prevalence of bird representations in mortuary contexts of the Middle and Late Woodland may be related to the flight of the dying soul. Perhaps birds were called upon by shamans to help ferry souls to the afterlife, as in Kitchell’s (2010) interpretation the bird-headed humans of Basketmaker rock art. The ability of birds to fly as well as traverse a tripartite universe may have linked these animals with shamans by exhibiting qualities metaphorically indexed in ritual practice (Pluckhahn 2010).
Several authors have noted the prevalence of so-called “spoonbill motifs” depicted on mortuary vessels from the Midwest to the lower Mississippi Valley. At the Hopewell site in Chillicothe, Ohio a carving on a human femur depicts a masked “impersonator” with deer antlers and the nose of a roseate spoonbill. This effigy recovered from Mound 25 may represent the act of a religious practitioner regaled for a ceremony, perhaps, in Robert Hall’s (1979, 1997) view, enacting Spirit Adoption. Not only does the spoonbill show up in effigy form in Hopewellian burials but also in physical form. Parmalee and Perino (1971) reported the burial of an adult and a child from Gibson Mound 3 that included the headless, but otherwise complete, remains of a roseate spoonbill.

Avian Remains as Ritual Elements

Given that birds factored so prominently in the material culture and, presumably, the cosmos of pre-Columbian peoples of the Eastern Woodlands in the first millennium, how do bird remains recovered in pits and middens factor into rituality? With notable exception, such as Parmalee and Perino’s (1971) work, few studies have attempted to reconcile the relationship between bony remains of birds with the representation of birds in material culture. In the report of McKeithen mounds in north-central Florida, Jim Knight (in Milanich et al. 1984:163-184) attempted to identify the species of animals depicted on Weeden Island effigy vessels recovered from mortuary mounds in the lower Southeast. Seventy-two percent of the species Knight identified among Weeden Island effigy motifs were birds, including unidentifiable categories. He then compared his taxonomic list to the analyzed archaeofaunal data from the presumed coeval Melton site (8A169). While the Melton assemblage contained avian remains representing a number
different species, including white ibis and other waterbirds, none of the bird species identified in the assemblage overlap with Knight’s Weeden Island effigy taxonomy (Cuumba 1972, Milanich et al. 1984:168).

The identified faunal assemblage from Melton is remarkable in its relative frequency of avian remains compared to archaeofaunal assemblages from the Gulf Coastal Plain dating to the Woodland period (Byrd 1994; Kratt 2005; Lawson 2005; Mikell 2012; Nanfro 2004; Orr 2007; Pluckhahn et al. 2006). What is more remarkable is that, according to Cuumba (1972), the majority of the avian remains at Melton were recovered from a single pit feature. A similar pit feature from Shell Mound, Feature 25 is the subject of this thesis. The vertebrate faunal materials from Feature 25 include the elements of several deer, turtle, large jacks and drums, over 90 individual mullet, and a minimum of nineteen individual birds. Feature 25 contains both more mullet and more bird than any other context analyzed from Shell Mound or the greater project area of the Lower Suwannee Archaeological Survey (Sassaman et al. 2015).

The concentration of large pit features excavated along the interior of the northern arm of Shell Mound during 2014 and 2015 field seasons are of particular interest as these offer discrete contexts that represent specific events in time. Given the nature of the paleodune sands into which many of these pits were dug, the steep walls of pits do not remain so for long in these fine sands. The size and profile of Feature 25 and others suggest that rather than being left open to the elements and gradually accumulating, they were infilled over a short period of time. Given the high density of vertebrate fauna, ceramic assemblage, and other rare or nonlocal items including quartz crystal, mica, and a modified panther tooth, the contents of these large pit features are
not assumed to be indicative of everyday subsistence activities at Shell Mound, but rather they represent the coordinated action of a group of people taking part in a feasting-type ritual activity, possibly associated with mortuary practices centered on Palmetto Mound (Sassaman et al. 2017).

The presence of avian remains should garner special attention when encountered in mound contexts. Given the prevalence of bird iconography associated with Southeastern mound ceremonialism, and their roles in many pre-Columbian cosmologies, their appearance in mound or elite contexts should not be assumed to be the result of subsistence related practices. Because of their “cosmological attributes” certain animals may hold symbolic importance used to convey meaning to onlookers or to negotiate with external forces (Jackson and Scott 1995:104). This suggests that faunal assemblages that resulted from the ritual consumption or the display of these symbolic animals or their parts were potentially treated differently and are therefore distinguishable from quotidian deposits. According to Jackson and Scott (1995:107), “Despite the generally uniform nature of Southeastern subsistence, careful examination of specific contexts should, nonetheless, isolate evidence of difference.” By analyzing the context of the Feature 25 vertebrate faunal assemblage at different temporal and spatial scales, this thesis argues that white ibis and other avian remains were deposited at Shell Mound as a result of ritual practice.

Based on the prevalence of solar alignments found in the architecture of North American mound centers, several authors have suggested that large gatherings at civic-ceremonial centers occurred in accordance with astronomical movements of the celestial calendar (Pauketat 2013; Randall and Sassaman 2017; Romain 2015). By
timing events to the astronomic calendar, visitors from afar would be able to coordinate their travels with others throughout the region. The antiquity of terraforming along celestial alignments in the Southeast reaches back to the massive earthworks at Poverty Point (Romain 2015; Sassaman 2016), although Randall and Sassaman (2017) suggest that humans may have been coordinating their practices on the land with the paths of the sun much earlier. Romain (2015:13) writes that Hopewell earthworks of the Midwest were typically constructed in alignment with the sun and moon, and “once incorporated into monumental architecture, a visual link is established between that structure and the cosmos.” Shell Mound itself was constructed in accordance with the paths of the sun, opening to the rising winter solstice and closing to the setting summer solstice. The timing of the death of the juvenile white ibis individuals recovered from Feature 25 provides a temporal marker for this depositional event at Shell Mound that evidence suggests coincides with the summer solstice around June 21.

This thesis presents evidence in the interpretation that Feature 25 represents an event that coincided with the summer solstice where people gathered at Shell Mound in communal practices tied to their ancestors. The vertebrate remains and the nature of their deposition suggest that this was not the accumulation of village food waste over a duration of time, but the remains of a feasting event. Feature 25 does not stand alone. The large number of similar pits located in the northern interior suggests that feasting events were a recurring practice at Shell Mound. The collection, processing, and serving of the over ninety mullet, the large jacks and drums, deer, turtle, and birds would have surely constituted a coordinated effort by the people of Shell Mound. In addition to fauna, materials recovered from Feature 25 include several types and forms
of ceramic wares, exotic items such as quartz crystal, mica, and nonlocal chert bifaces, as well as modified faunal elements including the teeth of shark and panther.

In Chapter 2, human and animal interaction is investigated and structuralist interpretations are critiqued considering the theoretical concepts of relational ontologies and phenomenology. Chapter 3 outlines the methods employed in the excavation of Feature 25, and the method and results of analysis of the recovered vertebrate faunal remains. Chapter 4 provides an overview of breeding ecology of colonial nesting birds, particularly white ibis, in the Cedar Key vicinity of Florida's Big Bend region in order to demonstrate how juvenile ibis elements provide a temporal marker for Feature 25 contents. Chapter 5 concludes with an interpretation that compiles data recovered in this analysis with previous known evidence from Shell Mound, the Southeast region, and beyond.
CHAPTER 2
APPLYING RELATIONAL ONTOLOGIES TO THE STUDY OF ARCHEOFANAUL REMAINS

Given recent theoretical contributions to archaeology involving considerations of nonwestern and relational ontologies, animal remains recovered in archaeological contexts cannot be expected to be randomly distributed. This body of literature demonstrates the significance of animal-human relationships that permeate the lives of hunter-gatherers. In Chapter 2, a literature review is presented in order to substantiate the assertion that relational ontologies affect the distribution of animal parts. These works are then used to consider associations in contexts that may be considered bundles or meaningful assemblages as an alternative to previous structuralist approaches at understanding meaningful associations with animals and materials.

Traditionally anthropologists have sought to understand hunter-gatherers not on their terms, but through our own Western perspective, which is arguably ill equipped to understand a world and reality so distanced from our own. Our western intellectual heritage traces back to the thinkers of the Enlightenment, who eschewed the supernatural in favor of observable absolutes in order to make sense of their world. The premise that phenomena can be repeatedly observed, recorded, and analyzed to produce facts is rooted in the separation between the subject (the observer) and the object (the observed). When a human encounters a flower in the woods, the reality of the flower exists in its fixed and factual attributes, which will remain largely unchanged the next time that flower is observed by a human. Western ontology sets humans apart from all other earthly life forms as the only “persons” able to think and react to the world through their own agency. This separation renders plants, animals, and the landscape
potential resources to be brought under yoke and plow, consumed, and managed as humans see fit.

In the last two decades relational ontologies have been increasingly promoted as a useful alternative to Western perspectives in the study of hunter-gatherer archaeology. For hunter-gatherers and other non-western peoples, one’s perception of the world is “constituted through their engagement with it, in the course of everyday… activities” (Ingold 2000:58). Meanings are never fixed, but rather, they arise out of our relationships with the world (Ingold 2000; Joyce 2015; Olsen 2003; Thomas 2001; Vivieros De Castro 1998; Watts 2013). The so-called “ontological turn” in anthropology has led to a critical evaluation of the western bias through which the archaeological record and the people who created it are interpreted. As Alberti and Bray (2009:338) write, when anthropologists attempt to describe the world of past peoples through their own substantive ontologies, they are locking life into a “rigid set of possibilities.” Through an acknowledgement of alternative ontologies, or ways of being, archaeologists can better understand past practices and how these practices affect the residues left behind. For the zooarchaeologists in particular, relational ontologies should challenge functionalist interpretations that consider animals in terms of their caloric value alone and ignore the complex social and symbolic relationships between animals and humans (Russell 2012:1-10).

**Human and Animal Interactions**

**The Modern Condition**

In the essay *We Have Never Been Modern*, Bruno Latour (1993) describes the condition of modern Westerners. As moderns, he writes, we have separated our world
into domains through an act Latour (1993) calls “purification.” The most notable of these, “The Great Divide,” separated Nature and Society, which led to the “Second Great Divide” separating “Us” (moderns) from “Them” (premoderns), for as we moderns “purify” our world into dichotomous domains, by virtue of our separation from premoderns it follows that our counterparts would not make the same distinction in their worlds as moderns, and so we relegate them to Nature status (Latour 1993:98-100).

However, Latour (1993) contends that we have actually never been modern by virtue of the fact that our acts of purification have never been as tidy as we attest to. We strive to keep politics and religion separate, yet religious values often affect government policy. We try to keep science and economics separate, yet scientific research may be influenced by the sources of funding which it courts. This leakage infiltrates our relationships with “objects” when we name and ascribe personalities to our cars or other material objects we interact with. Musicians are famous for imparting elements of personhood to the instruments they play, as producing music from an instrument often requires negotiating with these material objects as they slip out of tune or do not react as the player intends. Willie Nelson’s Trigger and B.B. King’s Lucile are two famous examples where a particular instrument was so intimately entwined with their owner’s art, and were so iconic in defining the unique sound of these musicians, that they have become more than just a guitar, but one half of a musical partnership.

Another example of how moderns muddle the divide between subject and object is in the way we attribute human-ness to our pets, treating them nearly as other persons within the household. However, what appears to be a blurring of the lines between humans and animals, actually “constitutes the exception that proves the rule: namely
that, in the West, to be a person is to be human” (Ingold 2000:91). Contrary to a purely non-western perspective, pets are never truly human, nor are they fully developed persons. Instead, they are only ascribed human-ness through their close proximity to their owners who impose on them a state of “perpetual childhood” (Ingold 2000: 91). We treat our pets not as equals, but as beings requiring the nurturing hand of humans in order to survive.

This notion is not at odds with a modern perspective of animals, and nature, as things separated that require human intervention through protection or conservation. For hunter-gatherers, the forest is seen not as something to protect, but the protector. Drawing from Cree ethnography, Ingold (2000:48) writes that hunter-gatherers perceive of the forest not as a child but as a parent, and humans and animals are not separated, but rather they are partners in a “cosmic economy of sharing.” The forest offers up its resources, and like Ingold’s (2000) description of the Cree and Jordan’s (2003) study of the Khanty of Siberia, animals are not simply quarry to be pursued but participants in the same world who offer themselves to humans. Humans, in turn, must reciprocate.

**Alternative Perspectives: Other-than-Human Persons**

For the non-Westerner, personhood is not a privilege of humans alone. Vivieros de Castro (1998) writes that the category of the person in Amerindian cosmologies can include humans as well as animals and spirits based on the idea that Amerindians recognize the subjective quality of humans, animals, and spirits. Because the reality of being, such as predator and prey, is relational to the perspective taken, as a being holds a perspective they become subjects. In that all natural beings are thought to possess a spirit, or a soul, they may be understood as similar in spirit yet diverse in corporeal form.
When an animal offers itself to a Cree hunter, it is not facing ultimate destruction through death but regeneration as part of living beings’ mutable properties. Because of this the hunter must adhere to a contract with his animal partner, for if certain observances are not met, the animals will not offer themselves to the hunter again (Ingold 2000).

These observances can include how the animal is taken, how the carcass is treated, and even how the meat is shared among the hunter’s community (Ingold 2000). Similar observations were made by Jordan (2003) among the Khanty of Siberia where prescribed methods for the deposition of the bones of hunted animals denote an act of respect. These depositional practices are attributed to garnering future hunting success by insuring that the soul of the killed animal will be revived after death and by appeasing animal masters of the forest, namely the bear (Jordan 2003). While a relational ontology applies to the Khanty in their recognition of the personhood of animals, all animals within the forest are not equal, but different persons, so that the remains of certain species are treated differently than others (Jordan 2003). The skull, claws, and hide of hunted bear, for example, must be positioned in a certain way for display in ceremonies proceeding the hunt; and bear is the only animal that receives final burial in the water (Jordan 2003).

The reverence shown for the bear, the master of the animals, in Khanty hunting rituals is not unusual among Boreal peoples in both hemispheres. The Ojibwa, for instance, believe that the spirit masters of animals are one of the four classes of most powerful ‘persons’ within their cosmology along with the Sun, the Four Winds, and the Thunderbird (Ingold 2000:93). These “other-than-human grandfathers,” like other
human and non-human persons, possess an enduring soul yet their corporeal form is mutable allowing them to take the guise of other animals and humans (Ingold 2000:92-93). Many indigenous cultures worldwide maintain that certain powerful human persons possess the ability to transform into various animal forms. Vivieros de Castro (1998) noted that in many South American groups, when a shaman puts on an animal skin or adorns themselves with the feathers of birds, they become imbued with the particular bodily skills or cosmological abilities of that animal. Because all living beings are thought to possess an inward personhood, changing form is like changing one’s clothes.

**The Animating Properties of Bundles**

As mentioned above, personhood is not the sole privilege of human beings alone in non-modern cosmology, nor is it necessarily relegated to the living. Maria Zedeño (2008) describes the Blackfoot bundle system in which animate object-persons inhabiting the ceremonial bundles may assist the bundle holder in certain matters. These bundles, which are collections of various objects usually held together in a skin and tied together with a cord, possess personhood in their own right, but their power may be respective of the duration of their “life times,” their origin, and the combination of object-persons held within (Zedeño 2008).

Zedeño’s (2008, 2009) work makes clear that a key advantage of considering relational ontologies lies in the understanding that materials take on meaning in relation to other materials within depositional contexts beyond the typical context associations made by archaeologists. According to Zedeño (2009), ethnographically documented categories exist for objects that animate other objects and places when they occur together in relational contexts. Often “a distinctive kind of natural or modified object”
these “index objects” have been used in some cases to assess legal classifications of artifacts under the Native American Graves and Repatriation Act (Zedeño 2009:412). In those cases mentioned by Zedeño (2009) Native American consultants worked with archaeologists to identify index objects found in seemingly mundane contexts that may not have been considered sacred to cultural resource managers. Because of the animating power believed to reside in these objects, their spatial relationship with other objects imparts special meaning in their combination.

The relational properties of gathered materials are not constrained to ceremonial bundles of native North Americans but may extend to the deposited contents of pit features as well ritualized landscapes (Blessing 2015; Gillmore 2015, 2016; Pauketat 2013; Wallis and Blessing 2015). Following Zedeño (2008) and Pauketat (2013), Wallis and Blessing (2015) privilege relational ontologies and bundling practices in their interpretation of the contents of a pit feature recovered from the Parnell Mound in northern peninsular Florida. They note that while a preponderance of literature exists on feasting in pre-Columbian societies, the depositional acts that accompanied feasting events, and ultimately provided the materials for archaeological inquiry, have largely been overlooked or glossed over as methods for the disposal of food waste (Wallis and Blessing 2015:79).

Not only may the pits themselves be considered as bundles in the association of their contents, but the digging and infilling of pits may be interpreted as bundling practices that create and alter meanings through relational associations between pits and the configuration of earthen monuments, human burials, and astronomic alignments (Pauketat 2013; Wallis and Blessing 2015). Rather than viewing pit deposits as merely
the post-feast deposition of food refuse, Wallis and Blessing (2015) argue that large pit features like the one at Parnell encompass both the interpersonal relationships between human and non-human agents that dictate protocols for the taking, handling, and deposition of remains and the possibility that these eventful acts were culturally meaningful in and of themselves in the relationships between the entities they assemble.

**Implications for Archaeology**

**Reconsidering Faunal Remains**

As shown by Wallis and Blessing (2015), an acknowledgement of relational ontologies requires a reconsidering of human and animal interactions in the interpretation of archaeofaunal remains. As their work and the ethnographic evidence provided by Jordan (2003), Ingold (2000), Zedeño (2009), and others suggests, a relational ontology affects not only how certain animal remains were treated in death, but also how the animating qualities associated with bundled assemblages affected depositional practices. Erica Hill (2014) writes that traditional zooarchaeology has been hindered by an over-concern for the economic and caloric properties of archaeological faunal, reflecting our modern Western values. Instead, Hill (2014) proposes a “reimagining” of animals in prehistory in order to situate their importance as agents in myth and ritual. Hill (2014) advocates an awareness of animals’ behavioral attributes as an aid to zooarchaeological interpretation of how animals may have been experienced by the humans with whom they came into contact, to better understand the significance certain animals may have been imbued with.
A study of faunal remains from a site in Denmark conducted by Overton and Hamilakis (2013) incorporates alternative ontologies as well as phenomenological considerations of human and animal interactions into what the authors have termed a “social zooarchaeology,” a perspective in which animals are acknowledged as possessors of agency that engage in relationships both with humans and other animals. According to the authors, these relationships are formed in conjunction with how animals were experienced by humans. Witnessing things such as the seasonal arrival of migratory birds, the social behavior within groups of animals, and the sights and sounds accompanying the killing of animals affected how past humans conceived of certain animals. In instances like this one from Denmark, the arrival of migratory animals may be considered metaphorical of human gatherings (Overton and Hamilakis 2013).

Like the two previous studies, Chantal Conneller (2004) produced an alternative interpretation of faunal remains from Star Carr, a Mesolithic site in northern England. Following Vivieros de Castro (1998), Conneller presents the possibility that donning or using part of an animal’s body imbued the wearer or user with certain traits of the animal. Just as Brown (2006) and Pluckhahn (2010) have suggested that bird behaviors may have been considered metaphorical of some ritual practices of pre-Columbian shamans, recognizing that animals may have been privileged for their “effects,” or the powers they enabled, allows a different understanding of the use of animals in the production of cultural materials. Conneller (2004) argues that the large assemblage of red deer remains and modified artifacts at Star Carr should be viewed not by their own properties or identities, but rather with a consideration that materials, and perhaps humans, are able to become new entities through their relationships.
Discrete burials of animals such as the Hopewellian mortuary mound of the Elizabeth site (11PK512) where a juvenile bobcat was interred wearing a necklace of shell beads and bear canine teeth, as well as other cases of Hopewellian interments of humans with animals, including dogs and one roseate spoonbill, are just a few of the vast number of depositional contexts worldwide with explicit links to human-animal interaction (Perri et al. 2015). Recalling the ethnographic studies mentioned in Ingold (2000) and Jordan (2003) in which examples are provided of hunter-gatherer groups’ special treatment of animal carcasses and considering the influence of relational ontologies on the practices of human interaction with animals, how can zooarchaeology continue to focus on diet and economy alone? Through a relational ontology, animals were not merely subsistence for hunter-gatherers, but part of how hunter-gatherers related to their world.

**Reconsidering Zoomorphic Imagery**

Pre-Columbian cultures of Hopewell influence throughout the Eastern U.S. put strong emphasis on zoomorphic forms as represented in various media and depositional contexts including, in isolated instances, interment with humans (Steinen 2006; Sunderhaus and Blosser 2006). Although animals are clearly prominent figures in Middle and Late Woodland period iconography, how these representations relate to the bony remains of animals is not well understood.

Several authors have considered the symbolic import of zoomorphic forms found in pre-Colombian media. Most of these works have searched for meaning behind these cultural expressions through a structuralist framework, whereby the meaning of symbols are rooted in collective conceptions of social phenomena (Anderson and Sassaman
Based in Saussurean linguistics, structuralism holds that cultural meanings are dictated by a structure, like language where words convey universal ideas, yet these words may sound or appear different in different languages (Gillespie 2003; Wallis 2013). In structuralist interpretations meanings are dictated by the system, which is built on analogous relationships to categorical dualisms, such as male-female, inside-outside, life-death (Gillespie 2003).

Jim Knight approached the meaning behind species depicted on Weeden Island effigy vessels through such a structuralist view, arguing that “[c]lassification systems imposed on nature invariably take the imprint of social categories and so become part of the underlying shared social beliefs of a group or culture” (Milanich et al. 1984:179). Knight divides the animal species he observed into three classes based on culturally conceived notions of edibility. Ambiguous, taboo or inedible, and edible classes represent culturally accepted rules for appropriate social behavior (Milanich et al. 1984:171). While approaches like Knight’s have highlighted the importance of zoomorphic forms in pre-Columbian media, structuralist interpretations are incongruous with an ontology where meanings arise out of the dynamic relationships between and among things.

Structuralist approaches have been criticized for being ahistorical in that they are based on assumptions of continuity in symbolic meanings over long durations of time and therefore cannot track beginnings, endings, or changes in symbolic meaning over time (Anderson and Sassaman 2012:141-143; Gillespie 2003). The post-structuralist argument that “meanings are continually created through the engagement of subjects and objects with one another in specific contexts…” takes into account how cultural
symbols and meaning are influenced by both history and the human experience (Wallis 2013:209). Unlike structuralism, the post-structuralist approach is relational in that the reality of things is not static but formed as a result of the relationships between entities (Knappett 2012).

This work does not seek to provide a description of the meanings pre-Columbian people of North America, or Shell Mound more locally, ascribed to birds or other animals. Neither is it a claim that cultural meanings can be ascertained by simply shedding the cloak of modernity and adopting a non-Cartesian ontology. But in the spirit of post-structuralism and with consideration of the relational properties of humans, non-humans, materials, and phenomena it begs to suggest that meaning was intertwined in both the depositional event and the deposited contents that created Feature 25 at Shell Mound.

Chapter 3 presents the excavation and zooarchaeological methods used in the collection, processing, and identification of the vertebrate faunal remains from Feature 25. After an explanation of the methods, the results of the vertebrate faunal analysis are presented with a short explanation. Results show that bird remains make up a significant proportion of the total specimens identified. As will be demonstrated, the presence of juvenile white ibis elements in the assemblage from Feature 25 offers the opportunity to closely approximate the time of the year in which these individuals were captured and quickly deposited into this large pit feature. After considering relational ontologies and how they affect the treatment of animal remains, based on the timing and the associated context, I argue that Feature 25 is indicative of an event that was anything but mundane.
CHAPTER 3
BACKGROUND, METHODS, AND RESULTS

Chapter 3 begins with a background of Shell Mound, describing the site along with previous archaeological investigations. Next is a recounting of the excavations that took place over 2014 and 2015 and resulted in the collection of materials from Feature 25 analyzed in this thesis. A description of Feature 25 is provided including the spatial locations of samples from which the vertebrate fauna assemblage was taken followed by an explanation of the zooarchaeological methods employed in this study. The remainder of Chapter 3 presents the results of the analysis of the vertebrate fauna assemblage from Feature 25.

Site Background

Shell Mound (8LV42) is located on the Gulf Coast approximately 10 km north of the town of Cedar Key in Levy County, Florida. It is situated on the southwest end of a 2-km-long peninsula bounded by Dennis Creek to the south and a protected bay to the north and west. The mound itself is a U- or C-shaped ring of mostly oyster shell measuring roughly 190 x 180 m in plan and nearly 7 m tall at its apex with a central plaza opening to the southeast (Sassaman et al. 2013). Shell Mound is situated within the vicinity of two other mounds, Palmetto Mound 500 m to the west and Dennis Creek Mound 250 m to the northeast. Palmetto Mound has been locally known as a burial mound and source of Native relics for over a century, and as a result has been extensively damaged by looters and antiquities hunters (Donop 2017; Sassaman et al. 2017). The recently named, Dennis Creek Mound (Boucher 2017) was first noted by C.B. Moore in 1902 after excavating several exploratory trenches through the mound simply known as “Mound near the Shell-Heap, Levy County” (Moore 1902). The
designated archaeological site that encompasses Shell Mound is now protected by the U.S. Fish and Wildlife Service in one of its refuges, and while it was previously noted by Moore and others, prior to 2012 little was known about the site’s history as formal archaeological investigation had been limited to one test excavation placed in the highest point of the ridge and reported by Bullen and Dolen (1960).

Figure 3-1. Study area of the Lower Suwannee Archaeological Survey with Shell Mound (8LV42) shown in inset (Sassaman et al. 2013:2).

Beginning in 2012, investigation at Shell Mound began as part of a larger, ongoing project of the Lower Suwannee Archaeological Survey (LSAS) to locate, record, and test pre-Columbian archaeological sites located along an area of the northern Florida Gulf Coast (Figure 3-1) spanning nearly 42 kilometers of largely
undeveloped coastline (Sassaman et al. 2013). To date, the work at Shell Mound has resulted in 14 test excavation units placed in various locations on the ridge, the interior, and along the periphery of the mound, as well as shovel-testing of the off-mound areas to the adjacent northeast (Boucher 2017).

**Excavation Methods**

Excavation of TU 7 followed standard methodology employed by the LSAS. A local datum was established in the highest corner of the unit for vertical control and excavations were carried out by shovel and trowel in 10-cm arbitrary levels except for the upper 20 cm, which was removed as a single level. All general level fill was screened through ¼-inch hardware cloth, and all artifacts, vertebrate fauna, modified shell, and unmodified gastropod shell were retrieved and bagged by level. Bulk samples were taken from feature contexts as well as select strata of unit profiles. Information for the test unit, general levels, features, and samples taken were recorded on standard forms, and finished profiles were mapped following general protocols. All samples were labeled with corresponding provenience information. Nearing 30 cm below datum, the presence of many large, intersecting pit features became apparent. Conspicuous features were mapped and sampled, however in most cases feature boundaries were obscured due to the lack of shell in many of these large pits and the observation that many older pits had been later disrupted by ancient humans during subsequent acts of pit digging. In order to allow more precise delineation of features, the excavation strategy shifted to include trenching and box sections in an effort to expose a three-dimensional view. For a full description see the *Laboratory of Southeastern Technical Report 21* (Sassaman et al. 2015: 49-66).
Returning in 2015 to the northern interior slope with lessons learned from the previous summer, the excavation of the North Block units generally followed the same protocols that were used in TU 7 with the exception that levels were measured for depth below the surface as opposed to below datum. As the previous year had shown, with the prevalence of pits dug into the northern interior, the accurate recording and sampling of such features required a more nuanced approach. Therefore, it was decided that following the contours of the landform into which pits were initially dug would aid in the early detection of these features. With a local datum set in the northeast corner of the unit as 0 cm below surface, excavation of the 2 x 2-m Test Unit 10 proceeded by removing the top 20 cm as one level with subsequent general levels removed at 10-cm increments below the surface. At 30 cmbs the anticipated pit features presented themselves throughout the unit. Though amorphous, several appeared to extend into the walls of the test unit. Excavation was then expanded to include two adjacent 1 x 2 m units, TU 13 and TU 14.

Figure 3-2. The North Block, with approximated Feature 25.
Again trenches were used to delineate ambiguous pit features. In this case, 50-cm-wide exploratory trenches were emplaced in a cruciform pattern beginning in TU 10 and expanding into TU 13 to the west and TU 14 to the north. Each trench within a separate test unit was assigned its own number and was excavated following protocols for general levels. Pit features were excavated by hand with all materials collected, bagged and reserved for further off-site processing through 1/8-inch water screening and flotation with a Dausman Flote-Tech flotation machine and fractionated for further analysis at the Laboratory of Southeastern Archaeology in Gainesville, FL.

**Feature 25 and sampling:** Feature 25 is a large, silo-shaped pit feature measuring 90 cm in diameter and 180 cm deep, with an estimated volume of 1145.1 liters. It is classified as a *large cylinder* based on measurement criteria currently being used by the LSAS to differentiate pit types present at Shell Mound. Finished profiles revealed five separate recognizable strata. A radiocarbon assay on wood charcoal recovered in a bulk sample from the basal stratum of Feature 25, returned a 2-sigma calibrated age estimate of AD 425 – 600 (Sassaman et al. 2015).

Due to vagaries accompanying the sighting of feature boundaries in plan caused by the intersecting of several pits, various sampling strategies were used to collect the contents of Feature 25 when it was clear that collected samples were isolated from other feature contexts. Nine samples from different proveniences within the feature were used for this study. The majority were collected in 2014 from TU 7 by way of isolated feature fill removed during excavation and bulk samples taken from the finished profiles. The remaining two samples were retrieved from the lower portions of the North
Block excavation in 2015, again when Feature 25 contents were clearly isolated (Sassaman et al. 2015).

The largest sample from Feature 25 was removed as part of the SE Trench, which began as a box section used to define two other features within the southern portion of TU 7. When the western margin of Feature 25 was encountered, the trench was expanded to the east and south walls of the unit forming a 175 cm x 65-cm trench running along the south wall of the unit. The SE Trench (Figure 3-3) was initiated at 74.5 cm below datum and excavated to the base of Feature 25 at about 200 cm below datum. The entire contents of the SE Trench, which were estimated to consist mostly of Feature 25 fill, were passed through ¼-inch dry screen, and all materials collected in the screen were bagged for processing.

![Figure 3-3. Plan of Test Unit 7 with SE Exploratory Trench and Northern Residuum.](image)

After the trench had been excavated through the heart of Feature 25, the remaining portion of the feature observed in plan and profile was assigned a separate
provenience and removed as the Northern Residuum (Figure 3-3). These materials were processed in the same manner as the SE Trench contents. The remaining samples recovered in 2014 were removed as five bulk samples taken from separate strata as observed from the finished south and east profiles (Figure 3-4). The strata in Feature 25 were reported to “vary only slightly in color and texture and, with exception of the upper stratum (XXa), all strata are between 20 and 30 cm thick and generally conformant to the geometry of the pit” (Sassaman et al. 2015:63). Taken from strata in the heart of the pit feature between about 70 and 150 cm below the surface, each bulk sample consisted of about 14 liters of fill that were removed for flotation and fine screening (Sassaman et al. 2015).

Figure 3-4. North and East profiles of Test Unit 7 showing Feature 25 bulk sample location.

The two samples used for this study that were removed in 2015 both came from the intact lower reaches of Feature 25 not reached in the TU 7 excavation. As suspected, the southeastern extent of the large cylindrical pit was encountered by the
North Block excavations, although its isolated presence could not be unequivocally determined until excavations had reached a depth below surface of 86 cm. The remaining contents of Feature 25 were removed by hand, bagged, and reserved for processing through 1/8-inch water screening. The excavation of the North Block was met with unique circumstances not encountered the previous year, as increased rainfall throughout late summer had elevated the water table, submerging the lowest portions of Feature 25. Therefore, the two samples taken from the North Block included one sample taken from the remainder of the feature fill from 86 cmbs to the water level at 129 cmbs, and a second comprised of saturated fill removed by shovel down to a depth of 145 cmbs.

**Zooarchaeological Methods**

The vertebrate faunal assemblage selected for this study was selected from all bony remains captured in the greater than ¼-inch fraction of the samples previously described. It has become common practice in zooarchaeology to dismiss the utility of faunal analyses that do not include samples taken from at least 1/8-in, and even better, 1/16-inch fractions (Reitz and Wing 2008; Wing and Quitmyer 1985). The point is well taken, as a number of subsistence studies at southeastern coastal sites have shown that tiny fish and shrimp, not recoverable by “course” screening, are in fact likely to have been a large part of the coastal pre-Columbian diet and it is argued that neglecting fine-screened samples skews the relative abundance of certain taxa (Quitmyer 2004; Reitz et al. 2009).

This however, is not a study on subsistence. It is not difficult to accept that ancient coastal peoples ate small fish, being both abundant and easily captured with
minimal fishing skills by community members young and old. Certainly, small fish contributed a large portion of the daily caloric intake of coastal peoples, but the type of event this study seeks to understand through the faunal record of Feature 25 was not part of day-to-day activities. The taxa represented in this assemblage that demonstrate a marked deviation from previous studies in the area are perfectly amenable to collection with ¼-inch screen.

In addition, privileging the ¼-inch fraction over 1/8- and 1/16-inch fractions sidesteps the sampling issues inherent in these finer grained analyses. Due to the time constraints of analyzing fine-screened faunal materials, samples are often limited to small volume (50 x 50 x 10 cm) column samples. But while this type of sampling has been touted as the most comprehensive strategy for zooarchaeological analyses, due to the small size of the sample, certain species have the potential to be underrepresented. William Marquardt (2014:5) has recently conceded that column samples analyzed from Pineland “biases against [certain species] because such a small volume (50 x 50 x 10 cm) is sampled.” In a recent article, William Marquardt (2014:5-6) remarks on the analyzed faunal assemblages from Pineland, noting that because relative frequencies of mullet were so low in the fine-screened samples he has “downplayed the importance of mullet for the Calusa in the past.” However, as students of the University of Florida’s zooarchaeology class have been analyzing the ¼-inch samples from general excavation levels, emerging data suggest that mullet may have been biased against in previous analyses (Marquardt 2014:5-6). Given these potential biases it could be argued that analyses that examine the ¼-inch fraction from larger samples provide a more comprehensive view of the breadth of species present.
For this study, all vertebrate faunal remains collected through ¼ inch screening were hand sorted and identified to the most refined taxonomic category utilizing comparative collections housed in the Environmental Archaeology Department of the Florida Museum of Natural History and the Laboratory of Southeastern Archaeology at the University of Florida. Further identification of bird elements was made possible through access to the Florida Museum of Natural History Museum ornithology collections. In addition, field guides (Conant and Collins 1998; Gilbert and Williams 2002; Proctor and Lynch 2011; Reid 2006; Sibley 2003), zooarchaeological analysis guides (Gilbert 1985; Olsen 1964, 1968; Reitz and Wing 2008; Serjeantson 2009), and websites with informative species profiles (www.birds.cornell.edu; www.fishbase.com; www.myfwc.com) aided in the identification of vertebrate faunal materials.

Following methods outlined by Reitz and Wing (2008), all specimens were inspected for the presence of burning and modification, and recorded in terms of the element represented, portion of the element, side, anatomical features of age, modification, count, and weight. For identified specimens, the minimum number of individuals (MNI) was calculated according to observable characteristics such size and age, side of paired elements, and the presence of axial elements. All identification of vertebrate faunal remains from Feature 25 were made by the author with the exception of the majority of mullet elements which had been previously separated, quantified, and reported by Cristina Oliveira (Sassaman et al. 2015:94-98). For this study, ¼-inch mullet (Mugil sp.) specimens were isolated from Oliveira’s total sample, which included ¼- and 1/8-inch fractions, and reanalyzed along with additional ¼-inch specimens identified by the author. All data reported here for Mugil sp., including count, weight, and calculation
of MNI was derived from this compiled ¼ inch sample. Additional assistance with identifications was given by colleagues in the Environmental Archaeology Lab and David Steadman, curator of ornithology at the Florida Museum of Natural History.

**Results**

A total of 8,082 faunal specimens were analyzed from Feature 25, representing an estimated total of 204 individuals across 60 different taxa. Save for fragmentation, usually of the more fragile fish elements, preservation of bony remains was excellent because of the nature of deposition and the mineral content of the soil enriched by the overlying shell deposits. Evidence of burning was minimal, occurring on only 283 specimens, or 3.5% of the total sample. Modified elements included three whole or nearly whole shark teeth with drilled perforations and one panther premolar in which the two roots have been ground to a flat, even plane (Figure 3-5). Table 3-1 provides NISP, MNI, and total weight values representing the span of taxa identified in the Feature 25 assemblage.

![Figure 3-5. Modified vertebrate faunal specimens: (a) drilled shark teeth; (b) ground panther premolar.](image-url)
Table 3 -1. Results of zooarchaeological analysis of vertebrate faunal assemblage from Feature 25, Test Units 7, 10, 13, and 14, Shell Mound (8LV42).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Common Name</th>
<th>NISP</th>
<th>% NISP</th>
<th>MIN</th>
<th>% MNI</th>
<th>Wt. (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcharhinidae</td>
<td>requiem shark</td>
<td>7</td>
<td>0.09</td>
<td>3</td>
<td>1.47</td>
<td>2.39</td>
</tr>
<tr>
<td>Galeocerdo culvieri</td>
<td>tiger shark</td>
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<td>0.01</td>
<td>1</td>
<td>0.49</td>
<td>0.97</td>
</tr>
<tr>
<td>Aetobatus sp.</td>
<td>eagle ray</td>
<td>1</td>
<td>0.01</td>
<td>1</td>
<td>0.49</td>
<td>0.17</td>
</tr>
<tr>
<td>Dasyatis sp.</td>
<td>whiptail stingray</td>
<td>3</td>
<td>0.04</td>
<td>1</td>
<td>0.49</td>
<td>1.82</td>
</tr>
<tr>
<td>Actinopterygii</td>
<td>unidentified fish</td>
<td>3,518</td>
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<td></td>
<td>395.02</td>
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<tr>
<td>Acipenser oxyrinchus</td>
<td>Atlantic sturgeon</td>
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<td>0.33</td>
<td>1</td>
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<tr>
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<td>23</td>
<td>0.28</td>
<td>2</td>
<td>0.98</td>
<td>13.06</td>
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<tr>
<td>Amia calva</td>
<td>bowfin</td>
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<td>0.27</td>
<td>2</td>
<td>0.98</td>
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</tr>
<tr>
<td>Elops saurus</td>
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<td>0.05</td>
<td>1</td>
<td>0.49</td>
<td>0.28</td>
</tr>
<tr>
<td>Ariidae</td>
<td>catfish</td>
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<td>Ariopsis felis</td>
<td>hardhead catfish</td>
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<td>27.39</td>
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<td>Bagre marinus</td>
<td>gafftopsail catfish</td>
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<td>1.7</td>
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<td>Opsanus tau</td>
<td>oyster toadfish</td>
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<td>0.79</td>
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<td>snook</td>
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<td>0.01</td>
<td>1</td>
<td>0.49</td>
<td>0.4</td>
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<td>0.10</td>
<td>2</td>
<td>0.98</td>
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</tr>
<tr>
<td>Carangidae</td>
<td>jack</td>
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<td>1.99</td>
<td></td>
<td></td>
<td>133.61</td>
</tr>
<tr>
<td>Caranx sp.</td>
<td>cf. crevalle jack</td>
<td>218</td>
<td>2.70</td>
<td>9</td>
<td>4.41</td>
<td>105.31</td>
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<tr>
<td>Lobotes surinamensis</td>
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<td>0.11</td>
<td>1</td>
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<td>9.96</td>
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<td>0.02</td>
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<tr>
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<td>0.07</td>
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<td>0.64</td>
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<tr>
<td>Archosargus probatocephalus</td>
<td>sheepshead</td>
<td>92</td>
<td>1.14</td>
<td>10</td>
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<td>Lagodon rhomboides</td>
<td>pinfish</td>
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<td>0.07</td>
<td>4</td>
<td>1.96</td>
<td>0.43</td>
</tr>
<tr>
<td>Sciaenidae</td>
<td>drums, croaker, sea trout</td>
<td>24</td>
<td>0.30</td>
<td>4</td>
<td>1.96</td>
<td>2.6</td>
</tr>
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<td>Cynoscion sp.</td>
<td>sea trout</td>
<td>38</td>
<td>0.47</td>
<td>7</td>
<td>3.43</td>
<td>10.2</td>
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<tr>
<td>Pogonias cromis</td>
<td>black drum</td>
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<td>0.20</td>
<td>2</td>
<td>0.98</td>
<td>14.96</td>
</tr>
<tr>
<td>Sciaenops ocellatus</td>
<td>red drum</td>
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<td>0.80</td>
<td>6</td>
<td>2.94</td>
<td>42.08</td>
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<td>Paralichthys sp.</td>
<td>flounder</td>
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<td>0.35</td>
<td>4</td>
<td>1.96</td>
<td>4.62</td>
</tr>
<tr>
<td>Testudines</td>
<td>turtle</td>
<td>292</td>
<td>3.61</td>
<td></td>
<td></td>
<td>78.37</td>
</tr>
<tr>
<td>Chelydra serpentina</td>
<td>snapping turtle</td>
<td>8</td>
<td>0.10</td>
<td>2</td>
<td>0.98</td>
<td>4.59</td>
</tr>
<tr>
<td>Kinosternidae</td>
<td>mud and musk turtles</td>
<td>27</td>
<td>0.33</td>
<td>4</td>
<td>1.96</td>
<td>6.85</td>
</tr>
<tr>
<td>Kinosternon sp.</td>
<td>mud turtle</td>
<td>40</td>
<td>0.49</td>
<td>3</td>
<td>1.47</td>
<td>14.75</td>
</tr>
<tr>
<td>Terrapene carolina</td>
<td>eastern box turtle</td>
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<td>0.11</td>
<td>1</td>
<td>0.49</td>
<td>6.37</td>
</tr>
<tr>
<td>Pseudemys sp.</td>
<td>cooters and sliders</td>
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<td>0.02</td>
<td>1</td>
<td>0.49</td>
<td>0.66</td>
</tr>
<tr>
<td>Gopherus polyphemus</td>
<td>gopher tortoise</td>
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<td>0.27</td>
<td>1</td>
<td>0.49</td>
<td>41.46</td>
</tr>
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</table>
Table 3 -1. Continued

<table>
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<tr>
<th>Taxon</th>
<th>Common Name</th>
<th>NISP</th>
<th>% NISP</th>
<th>MIN</th>
<th>% MNI</th>
<th>Wt. (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheloniidae</td>
<td>sea turtle</td>
<td>148</td>
<td>1.83</td>
<td>0.00</td>
<td>123.77</td>
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<tr>
<td>Chelonia mydas</td>
<td>green sea turtle</td>
<td>18</td>
<td>0.22</td>
<td>1.47</td>
<td>26.51</td>
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</tr>
<tr>
<td>Colubridae</td>
<td></td>
<td>8</td>
<td>0.10</td>
<td>0.98</td>
<td>1.95</td>
<td></td>
</tr>
<tr>
<td>Viperidae</td>
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<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Aves</td>
<td>birds</td>
<td>75</td>
<td>0.93</td>
<td>0.00</td>
<td>11.19</td>
<td></td>
</tr>
<tr>
<td>Podilymbus podiceps</td>
<td>pied-billed grebe</td>
<td>4</td>
<td>0.05</td>
<td>0.49</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Podiceps auritus</td>
<td>horned grebe</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Ardea herodias</td>
<td>great blue heron</td>
<td>2</td>
<td>0.02</td>
<td>0.49</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>Nycticorax violacea</td>
<td>yellow-crowned night heron</td>
<td>3</td>
<td>0.04</td>
<td>0.49</td>
<td>1.36</td>
<td></td>
</tr>
<tr>
<td>Eudocimus albus</td>
<td>white ibis</td>
<td>128</td>
<td>1.58</td>
<td>5.39</td>
<td>66.47</td>
<td></td>
</tr>
<tr>
<td>Platalea ajaja</td>
<td>roseate spoonbill</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Anatidae</td>
<td>duck</td>
<td>9</td>
<td>0.11</td>
<td>0.98</td>
<td>1.39</td>
<td></td>
</tr>
<tr>
<td>Larus argentatus</td>
<td>herring gull</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Mammalia</td>
<td>mammals</td>
<td>3</td>
<td>0.04</td>
<td>0.00</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Medium mammal</td>
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<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Large Mammal</td>
<td></td>
<td>89</td>
<td>1.10</td>
<td>0.00</td>
<td>105.46</td>
<td></td>
</tr>
<tr>
<td>Didelphis virginiana</td>
<td>opossum</td>
<td>8</td>
<td>0.10</td>
<td>0.49</td>
<td>12.97</td>
<td></td>
</tr>
<tr>
<td>Medium Carnivora</td>
<td></td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Puma concolor</td>
<td>cougar</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>1.49</td>
<td></td>
</tr>
<tr>
<td>Tursiops truncatus</td>
<td>bottlenose dolphin</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Odocoileus virginiana</td>
<td>white-tailed deer</td>
<td>90</td>
<td>1.11</td>
<td>0.98</td>
<td>267.13</td>
<td></td>
</tr>
<tr>
<td>Neotoma floridana</td>
<td>eastern woodrat</td>
<td>1</td>
<td>0.01</td>
<td>0.49</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Sigmodon hispidus</td>
<td>hispid cotton rat</td>
<td>2</td>
<td>0.02</td>
<td>0.49</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Sylvilagus sp.</td>
<td>rabbit</td>
<td>25</td>
<td>0.31</td>
<td>1.47</td>
<td>15.76</td>
<td></td>
</tr>
<tr>
<td>Vertebrata</td>
<td></td>
<td>233</td>
<td>2.88</td>
<td>0.00</td>
<td>44.04</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>8,082</td>
<td>100.00</td>
<td>204</td>
<td>100.00</td>
<td>2,067.58</td>
</tr>
</tbody>
</table>

Fish remains dominate the contents of Feature 25 including 2,421 mullet elements alone, representing 56% of the total number of individual fish (Figure 4-6).

While the majority of fish represented are saltwater species, several fresh water varieties are present. Though not expressed in these data, the fish assemblage was also notable for the presence of a number of specimens representing relatively large individual jacks and drums. Several taxa of turtle were identified although the high
occurrence of sea turtle elements deviated from previous faunal studies conducted from Shell Mound. Green Sea Turtle was positively identified from several exceptionally well-preserved cranium elements as well as diagnostic peripheral elements. Given the difficulties in distinguishing sea turtle species from fragmentary plural and costal elements, it is expected that the many of the elements not identifiable beyond genus belong to the green turtle, although the other species of sea turtle that occur locally could not be discounted. Deer make up a large percentage of the total mammal assemblage with a full range of skeletal elements representing two individuals. Several deer specimens were refitted from two or more specimens from the same element, although many of the long bones had been essentially shattered. Fragmentary specimens lacking distinguishing features, while expected to belong to deer, were sorted as large mammal.

Table 3-2. Major classes of identified taxa from Feature 25 arranged by MNI.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>NISP</th>
<th>MNI</th>
<th>Wt. (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishes</td>
<td>6,828</td>
<td>159</td>
<td>1,227.27</td>
</tr>
<tr>
<td>Birds</td>
<td>224</td>
<td>19</td>
<td>85.7</td>
</tr>
<tr>
<td>Reptiles</td>
<td>575</td>
<td>14</td>
<td>305.49</td>
</tr>
<tr>
<td>Mammals</td>
<td>222</td>
<td>12</td>
<td>405.08</td>
</tr>
<tr>
<td>Unidentified Vertebrate</td>
<td>233</td>
<td></td>
<td>44.04</td>
</tr>
<tr>
<td>Totals</td>
<td>8,082</td>
<td>204</td>
<td>2067.58</td>
</tr>
</tbody>
</table>

While the majority of the identified bony remains from Feature 25 are fish, bird specimens comprise the second largest estimated number of individuals. A total of 224 bird specimens were identified to nine taxa, representing an estimated 19 minimum number of individuals. Over half of the total bird specimens were identified as white ibis
representing the full range of skeleton from cranium fragments to axial and paired limb elements. No evidence of burning or butchery was detected on any of the bird specimens from the Feature 25 assemblage. The second largest NISP in any bird category (75) belonged to the general class Aves, and consisted mostly of unidentifiable long bone fragments and small distal limb elements. Nine specimens were identified to the family Anatidae, used as a catchall category for the various species of ducks. An estimated two individual ducks made up the second largest occurrence of bird individuals belonging to a single category. Other identified species include pied-billed and horned grebe, great blue and yellow-crowned night heron, roseate spoonbill, and herring gull. Each of these identified species was identified by only a few recovered elements, representing one individual each. The roseate spoonbill and the herring gull are represented by a single distal wing element, and the great blue heron is represented by two wing elements.

Of the total 11 minimum number of ibis individuals, nine were determined to be juveniles based on the presence of under-developed and unfused elements (Figure 3-6). The term juvenile, as used here, refers to nestling young distinguished from fledgling sub-adults. According to David Steadman, curator of ornithology at the Florida Museum of Natural History, these elements represent the life stage of very young individuals that have yet to leave the nest as opposed to those ibis that are not yet adult but fully independent. In the Cambridge Manual *Birds*, Dale Serjeantson (2009:47) writes that the fusion stage of bird elements is “the best source of evidence for age at death.” Based upon the examples of four other zooarchaeological studies that defined age stages of bird elements based on fusion and porosity, Serjeantson (2009:45-46) defines
four age categories for recording archaeological bird bones: Very Young (hatchling), Immature (nestling), Subadult (fledgling), and Adult. Because not all elements fuse, and rates of fusion differ between elements, tibiotarsi and metatarsi are recommended elements for making age determinations. According to Serjeantson (2009:46), the bones of nestling juveniles are porous and unfused at relevant locations where the bones of fledgling subadults “are of adult length but still have some evidence of porosity and, where relevant, a visible fusion line.”

Figure 3-6. Selected juvenile white ibis specimens: (a) left tibiotarsus; (b) right tibiotarsus; (c) right tarsometatarsus; (d) right tarsometatarsus proximal half; (e) left coracoid; (f) right coracoid; (g) right femur; (f) right humerus.

In figures 3-7 and 3-8, tarsometatarsi and tibiotarsi from white ibis comparative specimens are shown representing three of Serjeantson’s (2009:46) proposed life stages. These comparative specimens show that although the epiphyses are not completely fused, sub-adult morphology closely resembles the adult examples. In
contrast, the juvenile examples demonstrate a markedly under-developed morphology and higher porosity relative to the older specimens. In white ibis, as was suggested by Serjeantson (2009) for other bird species, this distinguishing characteristic seems to be most notable in the proximal portions of the tibiotarsus and tarsometatarsus.

Figure 3-7. Right tarsometatarsus: (a) juvenile; (b) sub-adult; (c) adult.
Figure 3-8. Left tibiotarsus: (a) juvenile; (b) sub-adult; (c) adult
Conclusion

Excavation of Test Unit 7 and the North Block, located in the interior slope of the northern arm of Shell Mound, has shown that people at this site were engaged in the digging of pits of various sizes around the middle of the first Millennium A.D. That many of these pits intercept one another is indicative of recurring practices. Although final analysis of the contents of other pit features is forthcoming, we know that into these pits they placed hundreds of animal individuals, pottery, and nonlocal items. Having experienced first-hand the nature of the dune sands into which these pits were dug, and how our excavation units were affected by factors such as time, rain, and delving below the water table, we can state with relative confidence based on these experiences that large, silo-shaped pit features such as Feature 25 represent single events. Given that all strata conform to the clearly defined and continuous edges of the feature, and the lack of any artifact-free strata observed within the pit, Feature 25 was most likely dug and backfilled within a matter of weeks if not days.

Although the focus of this thesis so far has been on the recovered bird remains, the complete results from the analysis of the ¼-inch vertebrate faunal assemblage from Feature 25 at Shell Mound reported here for the first time highlights some points worth mentioning in relation to the avian assemblage. The contents of Feature 25 are not indicative of food trash accumulated from the remains of quotidian meals consumed at Shell Mound. The presence of white ibis, sea turtle, deer, as well as several fresh water species of fish and turtle, speak to the concerted effort to collect resources from beyond the land and waters immediately adjacent to Shell Mound. The estimated minimum number of 204 individual animals collected for this event would have required the
dispatch of hunters and fisherman inland and seaward from Shell Mound to exploit known resource patches where these species congregated.

The ibis from Feature 25 are one such species that can help to better understand one of the distant resource patches exploited by Shell Mound hunters and the timing of the capture of these birds. White Ibis makes up over half of the avian assemblage, and represents the second highest MNI among taxa for which minimum numbers of individuals were estimated. The ibis assemblage is marked by the high quantity of elements bearing juvenile morphological traits relative to adult elements. MNI values estimated for ibis were nine juveniles and two adult individuals. The Cedar Keys, whose distal islands play host to annual breeding colonies of white ibis, have been the site of a number of studies focused on ibis breeding habits. Because there is fairly tight temporal data on ibis breeding, the timing of the event that led to deposition of the juvenile elements of white ibis may be confidently estimated.

Chapter 4 presents a species profile of the White Ibis, focusing on data obtained from a four year study of ibis breeding ecology conducted in the early 1970s on one of the distal islands of the Cedar Keys. My aim in presenting this information is to demonstrate how juvenile ibis elements may be temporal indicators for depositional events, and to paint for the reader a scene of the rookeries of the distal islands and how they may have been experienced by Shell Mound residents.
CHAPTER 4
THE BIRDS OF SUMMER

It is a pleasing sight at times of high winds and heavy thunderstorms, to observe the numerous squadrons of these Spanish curlews driving to and fro, turning and tacking about, high up in the air, when by their various evolutions in the different and opposite currents of the wind high in the clouds, their silvery white plumage gleams and sparkles like the brightest crystal, reflecting the sun-beams that dart upon them between the dark clouds.

—William Bartram
Travels through North and South Carolina, Georgia, East and West Florida

Chapter 4 discusses the breeding ecology of one of Florida’s most common waterbirds, the white ibis (Eudocimus albus), the dominant species identified among the avian faunal assemblage analyzed from Feature 25 at Shell Mound. Among specimens identified to the taxonomic level of family or better, white ibis represented the sixth highest percentage of total NISP, and comprises over 57 percent of the total number of bird remains. Although there are accounts from the recent past of the white ibis being used as a food source by some southwest Florida residents, where the bird has alternately been known as the “Chokoloskee Chicken,” my goal in presenting ibis breeding ecology is not to demonstrate their edibility, but to inform consideration of both the availability of these birds to Shell Mound denizens as a captured resource and how the timing of their breeding and nesting behaviors provides a temporal marker with which to approximate the timing of depositional events.

The Cedar Keys of Florida are home to one of the southeast North America’s core nesting areas for white ibis with consistent annual survey data that reaches back to the 1950s. Due to their conspicuous and social nesting habits, white ibis are amenable to sight surveys that have provided useful population data. Ibis aggregate in the spring at Cedar Key nesting sites in the several to tens of thousands, and as many as 100,000
breeding pairs have been recorded in one year (Frederick et al. 1996). In mid-March they begin nesting in low treetops at rookery colonies, usually hatching their first young by the end of April. According to David Steadman, curator of ornithology at the Florida Museum of Natural History, the juvenile white ibis individuals recovered from Feature 25 would have been captured before they had yet to permanently leave the nest. Based on the morphological characteristics of these elements and the timing of white ibis breeding ecology, Dr. Steadman estimates that they were likely killed sometime in mid- to late-June. Along with other strategies of resource intensification instrumented by Shell Mound’s inhabitants around the middle of the first millennium A.D., the white ibis rookeries on the distal islands of the Cedar Keys would have been a dependable source of this cosmologically charged animal for the ritual economy of Shell Mound.

That birds enjoy special status in the cosmologies of many cultures around the world is well-documented. Mythologies are populated with bird and bird-like characters and the feathers of birds are common in many ritual practices throughout the western hemisphere (Serjeantson 2003). While this may be, it is impossible to know how the white ibis played into the cosmological experience of Shell Mound peoples. Ethnohistoric literature from colonial North and South America certainly provides inspiration, and the ibis assemblage when considered in the context of the pit and the site itself, does suggest a deeper significance beyond quotidian table fare. However, without direct evidence, one can only speculate on the ritual significance or the meaning of the white ibis to pre-Columbian people of the Gulf Coast. Fortunately, because of the timing of the white ibis breeding season, and the preservation of juvenile elements from
Feature 25, there is evidence that suggests ritual significance of white ibis may be found in the timing of their deposition.

The White Ibis

White ibis (*Eudocimus albus*) is a medium-sized wading bird of the Threskiornithidae family along with the roseate spoonbill and its nearest relative, the scarlet ibis (*Eudocimus ruber*), whom some ornithologists would argue should be classified as a color-morph of the same species (Bildstein 1993). As its name suggests, white ibis adult plumage is pure white except for their black-tipped primary wing feathers and a pinkish bill, which matches in color the bare skin around the eyes and legs (Figure 4-1). During breeding season this pink turns to a deep red color. Juveniles are mostly dark brown with mottled head and neck and white underbelly. The white ibis has a long, curved bill used to probe around in the shallows and on land for their food, which consists primarily of crustaceans, insects, small fish, snakes, and frogs (Bildstein 1993; FWC 2003; Kushlan 1977).

Figure 4-1: Adult and Juvenile White ibis (Audubon 1843:55).
Eudocimus albus was known by various names by the early European naturalists to first make note of the bird. In the early- to mid-eighteenth century Mark Catesby first described it as the white and brown curlew, mistakenly classifying juvenile and adults as separate species based on their plumage (Bildstein 1993:11). The name curlew came from the bird’s similarity in beak shape with the Eurasian curlew, a bird familiar to European colonists. Curlews belong to the Scolopacidae, the family of sandpipers, and are not closely related to ibises. William Bartram (1993:136) similarly described white ibis in the 1790s as two species of Spanish curlew (Bildstein 1993:12). He wrote:

The first of these I shall mention is a perfect white, except the prime quill feathers, which are as black as those of a crow; the bill and legs of a beautiful clear red, as also a space clear of feathers about the eyes...They fly in large flocks or squadrons, evening and morning, to and from their feeding place or roosts; both species are called Spanish curlews: these and the crying bird feed chiefly on crayfish, whose cells they probe, and with their strong pinching gills drag them out: all the three species are esteemed excellent food [Bartram 1996:136].

The white ibis inhabits freshwater wetland areas and coastal estuarine environments, feeding in the shallow waters. They range from the western coasts of South America to the Gulf and Atlantic coasts of the southeastern United States. They are classified as nomadic due to low rates of breeding site-fidelity, and have been noted for their ability to move in order to adapt to ecological changes (Kushlan 1979, 1986). Although this bird’s nomadic tendency have given them the reputation as a wetland wanderer, Melvin et al. (1999:413-414) observed in a study of seven different species of waterbirds that while white ibis indicated the lowest site-fidelity, they averaged the shortest distance between nesting sites over consecutive years. So while they may be classified as nomads, they tend to remain in the same general area year after year as long as the availability of foraging habitat remains consistent (Kushlan 1986).
Although sightings of white ibis breeding pairs are consistent in the Cedar Keys, year after year, they are not invulnerable to major changes in population size. In a comparison study of site fidelity between white ibis and wood storks in the Everglades, Frederick and Ogden (1997:318) found that ibis are capable of rapidly changing breeding locations, with “large colonies disbanding and new ones forming, often in the space of 1 or 2 years.” For example, data show a two year increase of mating pairs at Cedar Key that went from 20,000 to 100,000 in the middle-1970s (Frederick and Ogden 1997).

Because they only travel 40 km or less to forage and their young lack the ability to excrete the salt from estuarine and marine invertebrate prey, ibis are locked into near-fresh water habitats (Frederick and Ogden 1997). Compared to other waterbird species, white ibis have been observed to be more sensitive to changes in water levels, climate, and resource stress, and their movements are thought to be directly related to ecological pressures (Kushlan 1986; Frederick and Ogden 1997; Frederick et al. 1996). “At Cedar Keys the number of nesting White ibises crashed in 1979 following a series of freezes that decimated mangrove nesting vegetation” (Frederick et al.1996:207). In fact, statewide surveys of white ibis colonies suggest a decline upwards of 55% from the late 1970s to the late 1980s. During this time rapid increases of ibis numbers in Louisiana apparently correlate with Florida decreases, and some have suggested that the growing crayfish aquaculture industry in LA may have been the impetus for this movement of white ibis (Frederick et al.1996).

Today, the white ibis is listed as a protected species in the state of Florida (FWC 2003). Many waterbird populations in Florida have declined largely as a result of habitat
degradation and loss over the course of the last century, although the ibis' adaptation to nomadic breeding “is not an artifact of twentieth-century human activity but an evolved feature of the life history of white ibises” (Frederick et al. 1996:212). As historical documents as well as the faunal assemblage from Shell Mound can attest, the white ibis has been a resident for at least the last 1,500 years. As of yet no evidence suggests that they would not have inhabited the distal islands of the Cedar Keys during the time of Shell Mound's heyday. To better understand how these waterbirds would have been experienced by the former human residents of the Gulf Coast, and to better understand the timing and season of their capture, it will be useful to discuss the breeding habits of these birds.

White Ibis Breeding Ecology

In a Ph.D. study Thomas Rudegeair (1975) observed the behavior and ecology of the white ibis (*Eudocimus albus*) over three breeding seasons from 1971 through 1974. He chose two nesting colony sites at which to conduct his studies, an inland lake located near Gainesville, FL, and Seahorse Key, a 154-acre island located about 4 km southwest of Cedar Key, FL. Offering fewer ground predators, and nearby access to freshwater wetlands, the offshore islands of the Cedar Keys host consistently recurring populations of nesting white ibis (Frederick et al. 1996:208). Rudegeair’s study resulted in a wealth of quantitative data on white ibis reproductive behavior from their arrival at the nesting site through the various phases of the breeding season and offers an extensive look into the breeding habits of this species.

White ibis are colonial nesters, often aggregating in low trees and shrubs over freshwater wetlands and coastal islands as the breeding season begins, often with other
species of marine birds including various species of herons and egrets (FWC 2003; Kushlan 1973; Rudegeair 1975). The breeding season of white ibis in central Florida begins as early as the beginning of March and may extend as late as the end of August, at which time the season’s new young are fully independent of their parents (Rudegeair 1975:16). While this is a largely coordinated event among individuals of a single colony, there are deviations in the timing of these events as some individuals and pairs show up at the nesting site and begin breeding later than others. Also, colonial nests in different locations will initiate the breeding season at different times depending on various environmental or ecological factors. The entire sequence of events from selection of the nesting site until the hatched young have reached independence from their parents lasts about 100 days, as calculated by the author from Rudegeair’s (1975) data.

**Congregation**

At Seahorse Key, Rudegeair (1975:16) observed a steady increase in ibis numbers beginning in early March. For at least two weeks before any actual breeding activity took place, Rudegeair witnessed steadily increasing numbers of ibis arriving each afternoon. Each morning during this time flocks of up to 20 birds left the island to feed and during the evening, flocks numbering upwards of 200 individuals returned (Rudegeair 1975:21). The first indication that breeding was commencing occurred after a couple of weeks, when rather than leaving at dawn, several hundred individuals remained on the island. As early as noon of this first day males began to claim their own space to establish a nesting site before initiating displaying rituals to attract potential mates (Rudegeair 1975:24).
Pair-Forming and Nesting

Rudegeair (1975:46) observed the beginning of nesting occurring on different parts of Seahorse Key over several weeks, when pair formation occurs in “clusters of five to 20 pairs all synchronized within 24 hours of each other and clumped together spatially.” Once the male has located an acceptable site from which he will entice females and eventually construct his nest, he begins performing pair-forming activities, which include a number of different displays. Several females may approach a male on his perch until acceptance of a mate is indicated by distinct displays and vocalizations by both members of the newly formed pair.

Over the next several days the ibis pair copulates frequently. Between mating acts the male will leave to search for nearby sticks and twigs with which the female will construct the nest. In his absence, males of other nearby pairs will attempt to copulate with the female, giving white ibis a reputation as promiscuous breeders (Rudegeair 1975:iix; see also Kushlan 1973). For the next few days the bonded pair will carry on in this manner until on the third or fourth day the female will leave the nest for the first time since the onset of the copulation period to feed. When she returns she resumes nest building until the fifth day when the first egg is laid, ending the copulation period (Rudegeair 1975:43-46).

White ibis construct their nests in a variety of tree species and bushes that make up the often low and tangled canopy of coastal islands. Over two winters, Rudegeair (1975:54) collected data on 1,000 ibis nests on Seahorse Key. These are built mostly of twigs up to three feet long and one inch in diameter with a final layer of bedding consisting of leaves and Spanish moss (Rudegeair 1975:58). Nests, which measured
on average 10 inches in diameter, varied in the tree species, the diameter of supporting branches, and height from the ground. While nests were observed as low as three feet from the ground, and as high as 36 feet, Rudegeair’s (1975:54-56) data show a mean value of 12.0 feet with a standard deviation of 5.3.

**Egg and Early Juvenile**

Clutch sizes observed by Rudegeair (1975:ix) over four years at Seahorse Key averaged 2.1 fledged young per mating pair. The first egg is laid on the fifth day after copulation begins, followed by the second egg two days later, and the third egg two days after the second. For the next 20 – 21 days of the incubation period, males and females will alternate tending the nest while the other leaves to feed (Rudegeair 1975:66). Once hatched, the young are fed by direct regurgitation and guarded by at least one parent for the first ten days when they are most vulnerable to falling from the nest and predatory attacks by other birds such as black-crowned night herons and fish crows (Rudegeair 1975:ix,7). After 10 days the newly hatched young become increasingly mobile and by week four they have the limited ability of flight to hop about the surrounding branches and limbs of the tree canopy. Still, they do not venture out of the tree tops, but rather roost outside of the nest and wait for their returning parents to bring food (Rudegeair 1975:77).

White ibis juveniles were fully independent at six to seven weeks, and feedings from parents become much less frequent. The juveniles can now fly and follow their parent in short circular trips around the island after feedings. At Seahorse Key Rudegeair (1975:80) observed seven-week-old juveniles leaving the tree tops for the first time to walk about in flocks around the island foraging for small fish and fiddler
crabs. The end of parenting was signaled when the juveniles followed a parent inland, never to return (Rudegeair 1975:82). Given Rudegeaire’s (1975) observed lengths of time for each period of the breeding season from pair forming of the parents to independence of the young, if white ibis breeding season began on Seahorse Key in mid-March, then that year’s young would be leaving the island about 100 days later, in late June.

**Ibis as a Resource**

Seahorse Key lies about 12 km due south of Shell Mound. Rising up to 52 feet above the water it is a prominent feature along the coast, and surely would have been known as a landmark by pre-Columbian coastal peoples. Their presence on the island has been documented in two aboriginal middens, which are registered as archaeological sites (8LV64 and 8LV68) with the state of Florida (Sassaman et al. 2015). Radiocarbon age estimates on materials collected by the LSAS occur a bit earlier than the height of activity at Shell Mound, although surface surveys have produced ceramic sherds that are associated with cultures contemporaneous with Feature 25 dates (Sassaman et al. 2015). Although no direct archaeological link has been made between Seahorse Key and Shell Mound, the presence of two other species associated with the distal islands, sea turtle and lightning whelk, found in Feature 25, lend credence to the assertion that people were in fact travelling to these far islands from Shell Mound, and therefore would have known of the ibis colony that nested there year after year.

It is unclear how the people of Shell Mound used white ibis. Based on the literature it is not difficult to imagine the white flight feathers of adults on display in the
costume and decoration of the people, as white and red feathers seem to be preferred by Southeastern peoples of the ethnohistoric past (Hudson 1976). However, nine of the eleven ibis individuals from Feature 25 were juveniles, and therefore would have had mostly feathers of brown. Judging by the historical accounts of ibis being eaten by westerners and non-westerners alike, the ibis from Feature 25 may very well have fed people gathered at Shell Mound. The observable characteristics of the ibis specimens themselves offered no evidence of butchering or burning, although most birds can be dressed with the minimal use of cutting implements, and many cooking methods would leave little recognizable trace of heat alteration (Serjeantson 2003:163).

In the literature review for this thesis there was no explicit mention of indigenous Americans using white ibis in particular as a source of food or feathers, although a close analog exists in the ethnohistory of South American native cultures. The scarlet ibis (Eudocimus ruber), biologically similar to the white ibis in almost every way save for the color of their feathers, and whose breeding ecology mimics that of the white ibis, was regarded as an important resource for the Tupinambá of coastal Brazil, from whose brilliant red feathers they produced floor-length coats worn only by their chiefs (Antas et al. 1990; Bildstein 1993; Buono 2007). Scarlet ibis were hunted for food as well, and as Antas et al. (1990:34) notes, “Breeding colonies of ibises were considered property of the tribe inhabiting the area, and many locations still bear the Indian name for Scarlet Ibis colony (Guara- plus –tiba or –tuba).” During and well after colonial rule, the scarlet ibis populations on the northeastern South American coasts were severely depleted by hunting for food and the European feather and artificial flower trades. Dujardin (1990:112) recounts how in French Guiana, “breeding colonies were systematically
raided by poachers for young; nesting trees were vigorously shaken, and the large young picked up from the ground."

Given the similarities between these two closely related ibis species, the previous accounts speak to the potential edibility of white ibis and offer an example of a strategy for procuring juvenile ibis in large numbers. In Dujardin’s (1990:112) account of scarlet ibis poaching in French Guiana, he writes that an estimated 90% of the season’s offspring were decimated through these annual colony raids. In early summer, fledgling young are nearing adult size yet are still underdeveloped, less mobile, and perched precariously on their island treetop roosts. Based on the reports of South American scarlet ibis poaching, it is not difficult to imagine ibis colonies on the Cedar Keys being exploited in similar ways.

And while we can only speculate on the symbolic importance of white ibis or how the remains of these birds recovered from Shell Mound were treated just prior to their deposition, the timing of their deposition may offer clues to the actual events for which they were captured. The white ibis breeding period lasts about one hundred days from the time when the first males begin to populate the nesting site until the newly hatched young are independent of their parents. Though not an exact calculation because of the variation of timing involved in nesting site selection and mate pairing, as well as year-to-year variation in timing due to environmental factors, 100 days from early- to mid-March still calculates to somewhere in mid- to late-June.

**Conclusion**

The presence of juvenile elements in the assemblage from Feature 25 offer the opportunity to closely approximate the time of the year in which these individuals were
captured and quickly deposited into this large pit feature. In Chapter 5 of this thesis I will
discuss the importance of this timing in relation to the ritual calendar Shell Mound
residents and visitors used to coordinate gatherings at this coastal civic-ceremonial
center. Archaeology may not be able to inform us on how people experienced the ritual
significance of the white ibis. Based on the observable characteristics present in the
faunal assemblage, we cannot say for a fact whether ibis were used for food or clothing;
whether they were dismembered for cooking and eating or to furnish ritual
paraphernalia. While we may not be able to discern how ibis were experienced in
relation to ritual practice, the juvenile elements from Feature 25 can help us better
understand when they were experienced, and by tying the deposition of Feature 25 to
the ritual calendar of Shell Mound the ritual importance of this waterbird may be inferred
from the timing of the event which created the deposit.
CHAPTER 5
WHEN THE OCEAN MEETS THE SKY

Feature 25 began as a two meter-deep cylindrical pit dug into the sands underlying what is now the northern interior slope of Shell Mound. Shortly after the pit was dug it was filled with the remains of over 200 animals, large pots indicative of vessels meant to serve many, handcrafted items such as modified predator teeth, and non-local quartz crystal and mica fragments. Among the individual animals identified from the faunal assemblage were deer, sea turtle, 90 mullet, and at least eight different species of waterbirds including herons, grebes, herring gull, roseate spoonbill, and eleven white ibis individuals. Most bird species are represented by only one or a few specimens: the roseate spoonbill, herring gull, and great blue heron were each identified by wing elements alone, and the possibility should be considered that these animals were not included because they were eaten, but because they served another function in this event (*sensu* Kelly and Kelly 2007). White ibis make up over half of the total bird assemblage, with a full range of skeletal elements representing two adults and nine juvenile individuals. Given the extensive data on white ibis breeding ecology of the Cedar Keys, the presence of elements belonging to nestling young ibis indicate that they were likely killed and subsequently deposited in middle- to late-June.

The mid- to late-June timing of the event that created Feature 25 would mean that this gathering would have occurred sometime around the summer solstice, the annually occurring day on which the earth’s North Pole is tilted the closest to the sun in its yearly orbit. There are two annually occurring solstices, usually June 21 and December 21, marking the point at which the sun is either at its closest or its furthest away relative to any latitude outside of the equator. This is because the Earth is tilted
23.5 degrees on its North/South axis as it makes its yearlong orbit around the sun. These points in the cycle of the Earth’s rotational path around the sun, along with two equinoxes marking the midpoints in-between, are what dictate our four seasons. For those in the latitudes north of the tropics the summer solstice marks the longest day of the year, when at mid-day the sun appears at its highest point in the sky and the rising and setting sun reach their most northerly points on the horizon (Pauketat 2013:62). The name solstice is derived from the Latin words for ‘sun’ and ‘standstill’ and refers to the way that from earth, the sun appears to pause before beginning its six-month-long track in reverse across the sky.

For pre-Columbian people tracking the regular movements of the sun and other celestial bodies visible in the sky, moments like the solstices would be temporal markers, observable to people scattered across the landscape (Randall and Sassaman 2017). As such, it has been suggested that large gatherings of geographically scattered people that coalesced at Southeastern and Midwestern ceremonial sites did so by timing their movements to the movements of the sun (Pauketat 2013; Randall and Sassaman 2017; Romain 2015). Beyond being just temporal markers, the solstices may have represented something more cosmologically significant. “Indeed,” writes Timothy Pauketat (2013:61), “all religions are based on cosmologies in turn undergirded by celestial observations.” The presence of solar alignments in Southeastern monument architecture has been recognized at Cakokia, Poverty Point, and numerous Hopewell sites (Pauketat 2013; Randall and Sassaman 2017; Romain 2015; Sassaman 2012). At the McKeithen site in north Florida solstitial alignments are found in the positioning of mounds and in the extended burial of the supposed ritual specialist in Mound B, who
was laid to rest with his feet pointing to the rising summer solstice and his head to the setting winter solstice (Milanich et al. 1984:107). By aligning aspects of the built landscape to the movement of the sun, mounds and other features become conduits where cosmological forces and human experience interact (Pauketat 2013:62; Romain 2015:2-3). According to William Romain (2015), these celestially aligned monuments “mediated relationships” between the earth and sky, the living and the dead, and human and non-human persons.

Shell Mound too appears to have been constructed according to the movement of the sun. By selecting a fixed point at Shell Mound directly west of the apex of Palmetto Mound, the northern and southern arms that make up the “c” shape of Shell Mound appear to conform to the angle formed by connecting points on the horizon of the rising and setting solstice suns (Figure 5-1). The same angle created between the setting summer solstice sun and the rising winter solstice sun can be seen in the positioning of the peninsula on which Shell Mound was built, a remnant arm of a Pleistocene sand dune.

It is not a coincidence that humans had mapped onto this landscape before Shell Mound was configured to the solstices. As Randall and Sassaman (2017) have noted, a recurring pattern exists on the northern Gulf coast of Florida where since at least the Late Archaic coastal people routinely sought these remnant distal arms of parabolic dunes first as inland cemeteries, and later as settlement sites offering refuge from rising seas. During the Pleistocene large parabolic dunes formed across the coastal plain as eolian sands were deposited and molded by the prevailing winds into crescent-shapes, with two distal arms extending back from the lee side of the dune. It just so happened
that because of the direction of the prevailing winds blowing out of the southwest, these parabolic dunes conform to solstice angles, with the apex pointing roughly 60 degrees east of north, the direction of the rising summer solstice sun, and with distal arms extending at an angle 240 degrees east of north, the direction of the setting winter solstice sun (Randall and Sassaman 2017:7).

Figure 5-1. Map of Shell Mound showing the angles of the solstice suns visible on the horizon from a point relative to the apex of Palmetto Mound to the West.

According to Randall and Sassaman (2017) it is no coincidence that Gulf coastal people gravitated to these landscape features. Citing work by Parker-Pearson (2013) that suggests the location of Stonehenge was chosen because of its proximity to solstice-aligned periglacial fissures, Randall and Sassaman (2017:7) contend that, like ancient inhabitants of the Salisbury plain, pre-Columbian people of the Gulf coast would
have been drawn to these celestially aligned landforms that to them, “indexed cosmic principles of enduring value.” According to the authors, these places, as well as the terraformed monuments that were built elsewhere in Florida and those that were later constructed on these landforms represent what they refer to as the “middle ground,” a place that substantiated a connection between the earth, the underworld, and the heavens; the past, present, and future; the living and the dead; the natural and the supernatural (Randall and Sassaman 2017:3).

**Bundling Shell Mound**

The concept that landscape features such as the parabolic dunes of the North American coastal plain and terraformed monuments such as Shell Mound represent this so called “Middle Ground” is a relational one. As William Romain (2015:2) writes, “in a relational field, religious practices were connected to the landscape; and earthworks and mounds were places where the trajectories of human and non-human agents and forces intersected. As discussed in Chapter 2 of this thesis, theory that confronts the western bias that separates subjects and objects allows archaeologists to consider the mutability of meaning through the concepts of assemblages and bundles to better understand how living humans negotiated with cosmological forces and other-than-human persons possessing agency of their own. Zackary Gillmore (2016:80) writes that places where large groups of people gathered to solidify social ties through ritual practices should be considered as “points of convergence for…potent amalgamations of disparate entities, including substances, objects, and bodies, as well as memories, traditions, identities, and ideas.” Not only do these places gather dispersed people, but in the convergence of people along with the materials they brought along, and in the
performative practices of terraforming, feasting, pit digging, and interring the dead, the events that shaped the history of these places are assemblages in themselves. Like the Blackfoot bundles discussed by Zedeño (2008, 2009) in which the meaning of the whole is greater than the sum of its constituent parts, each one of these events gathered new sets of entities that, in the present, create new associations with the past that portend into the future, bundling not only people and materials, but time and histories as well.

Feature 25 could be thought of as drawing many things together from various situated places on the landscape. Shell Mound, as any monumental structure, would have exerted a magnet-like force bringing together people throughout the region. Palmetto Mound, which was likely part of that draw, was gathering interments and pots for over a millennium. With them they brought exotic materials such as sheets of mica and quartz crystal whose origin is hundreds of kilometers away in the foothills of the Appalachian Mountains and items crafted from the most intimidating predators, as seen in the modified panther and shark teeth. Some specimens of the bird assemblage may have been part of the paraphernalia rather than the meal (Kelly and Kelly 2007). Not all bird individuals identified represented a full suite of skeletal elements such as the ducks which are represented only by vertebrae, or the roseate spoonbill, great blue heron, and herring gull, which are only represented by wing elements. Nonetheless, like the gathering of people and exotic materials, animals too were gathered into Feature 25 from various locations across the landscape.

This relational approach is taken by Tim Pauketat (2013) in the unpacking of Mississippian religion through his discussion of celestial alignments found at Cahokia and other mound centers of the region. According to Pauketat (2013:13) the
construction of Cahokia in accordance with celestial alignments emplaced the cosmos onto the earth and these and other associated practices that occurred there “bundled the otherwise dispersed powers of the universe in a myriad of ways and at multiple scales through hierophantic experience…” When groups of people coalesced at Cahokia during celestial events such as the solstices the pathways of human and non-humans converged, and “the more pathways that converge in that moment…the more cosmically powerful the relationships appear” (Pauketat 2013:28).

Following Tim Pauketat (2013), if a relational concept of pre-Columbian religion is accepted, in which the potency of religious experience is correlated with the increasing scale of bundled forces, and the more forces that are bundled the more powerful that event becomes, then deposits like Feature 25 at Shell Mound offer the opportunity to understand the power of ritual events by expanding the scale of analysis to account for increasing convergences of more pathways as the scale of bundled associations increases with space and time. At the smallest scale is the pit itself, Feature 25. Drawing from Wallis and Blessing’s (2015) interpretation of the pit feature at the Parnell Mound, the contents of Feature 25 can be viewed as a bundle of disparate but powerful entities, brought together across time and space to create new meaning through their combination in one meaningful event. The presence of waterbirds, which are assumed to have cosmological import given their prominent place in ritual media, and other materials such as quartz crystal, mica, and modified panther and shark teeth, suggests that Feature 25 was not merely a trash pit excavated to receive the remains of a large meal. Just as the event that created Feature 25 drew in people from afar,
materials and animals from around and outside of the region of Shell Mound were gathered into this pit.

Expanding the scope outside of Feature 25 itself to encompass the interior northern arm of Shell Mound, another potential bundle exists in the numerous pit features that define this part of the site. Final analysis of the contents of these pit features is forthcoming; preliminary findings suggest that like Feature 25, these represent similar events. Bundled here are the materials, animals, and forces as well as the history of people and gathering events that occurred over a 200 to 300 year period of place-making history.

Extending the focus again, the entire monument that is Shell Mound gathers even more into an increasingly large bundle that encompasses not only the many discrete gathering events that occurred there, but also could include the over one billion oysters and the building of the mound, which was surely an amalgam of events, as well as Palmetto Mound. Shell Mound’s associated cemetery could be considered a bundle in its own right with its own, much deeper history as a gathering place for the remains of countless ancestors and the objects with which they were interred (Donop 2017). By including Palmetto Mound, now bundled together are converging pathways that extend geographically across the greater Southeast and temporally across nearly 2000 years. Finally, at the scale of the greater Shell Mound site in its completed form the alignment of the constructed monument with the winter and summer solstices may be visible in relation to Palmetto Mound directly to the west, linking the built structure on earth to the cosmos (Romain 2015:13).
The Ritual Significance of White Ibis

According to Pauketat (2013:190), “ancient American religion was practiced not professed.” Through events such as feasting and mound construction at mortuary related places, and by timing events and aligning the built landscape to celestial movements and events, pre-Columbian people lived their cosmology through active engagement (Pauketat 2013:182; Romain 2015:14). To be at Shell Mound for the Feature 25 event would be to experience firsthand the convergence of cosmological forces, not as a bystander, but as a participant.

The question of the ritual importance of waterbird remains recovered at Shell Mound, like all of archaeological deposits, is a question of context. Surely, if one were to step back in time and visit a pre-Columbian village or mound center during the first millennium A.D., the signs of birds would have been abundant and readily observable. In the Cambridge archaeology manual on birds, Dale Searjeantson (2009:184) writes, “There is hardly a community in the world which has not used feathers and bird skins for decoration.” Bird feathers used as clothing, decoration, and as ritual paraphernalia items have been widely recorded in ethnographic and ethnohistoric accounts from around the world as well as in ethnohistoric accounts of Southeastern Indians of the colonial period (Bartram 1791; Hudson 1976; Jackson and Scott 1995; Kelly and Kelly 2007; Russell 2012:140; Searjeantson 2009). In these tantalizing accounts the use of feathers appears to accompany ceremonial practices in the regaling of participants and leaders. However, due to the preservation biases inherent in Southeastern archaeological deposits, these ephemeral traces of the past are not recoverable in most cases.
Fortunately, the more durable forms, such as certain artistic representations of birds and their deposited bony remains are amenable to recovery by archaeologists today. As for the media, a wealth of works exist that draw correlations between media featuring bird representations and ritual practices (Bernardini and Carr 2004; Brown 2006; Carr 2004; Carr and Case 2004; Hall 1997; Hall 2006; Milanich et al. 1984; Pluckhahn 2003, 2010; Steinen 2006; Sunderhaus and Blosser 2006; Weets et al. 2004). Waterbirds have been associated with ritual practitioners as in Robert Hall’s (2006) interpretation of the carved human femur from the Hopewell site which appears to depict a human masked as a roseate spoonbill with deer antlers. Ritual specialists have also been associated with birds because of their prevalence on Hopewell platform pipes. According to Brown (2006), birds depicted in effigy on tobacco pipes may have functioned as tutelaries to guide shamans along psychedelic visions induced by smoking tobacco.

The association of birds with death, possibly rooted in the departing flight of the dying soul, is not uncommon in cultures across time and space (Furst 1995:33-41; Serjeantson 2009:338-339). Consequently, some authors have suggested that the association with ritual specialists and birds involves their use in mortuary rituals. In the Southwest, Basketmaker rock art depictions of humans with bird heads have been interpreted by Kitchell (2010) as shamans using birds as psychopomps, taking bird form in order to guide the souls of the deceased into the afterlife. Likewise in the Late Woodland Deep South, Pluckhahn (2010) has presented the case that because of the preponderance of bird forms in Weeden Island effigy vessels exclusive to mortuary
contexts, birds may relate to the sodality of ritual specialists who presided over matters of the deceased.

Just as context is key in recognizing the ritual importance of Weeden Island effigy vessels, zooarchaeologists attempting to trace ritual behavior in the analysis of faunal assemblages must apply critical focus to the context of animal remains (Jackson and Scott 1995:107; Russell 2012:142; Serjeantson 2009:335). It is only through the careful examination of context in relation to the bony remains that differences may be detected that allow a distinction between economic and non-economic assemblages.

Few would argue with the case of ritual import found in the spoonbill burial from the Hopewell site reported by Parmalee and Perino (1971), which was buried headless with humans, apparently laid out in final repose similar to the humans that flank it on either side. Jackson and Scott (1995, 2003) have argued that faunal assemblages from mound-top contexts associated with elites at Moundville and other Mississippian sites show marked differences from other contexts in their inclusion of choice meat cuts as well as rarely included taxa assumed to hold symbolic or ritual importance such as dangerous predators and certain birds, among them white ibis.

If an observance of difference may be found in the faunal assemblage of Feature 25, first and foremost would be the large number of waterbird remains. Bird remains are not commonly reported in large numbers in faunal assemblages from roughly contemporaneous sites within the greater region, although Stephen Cumba’a’s (1972) analysis from the Melton site is an exception (Byrd 1994; Kratt 2005; Lawson 2005; Mikell 2012; Nanfro 2004; Orr 1998). Jackson and Scott (2003) remark at the fact that birds comprised the second highest number of taxa in the faunal assemblage analyzed.
from Mounds Q and G at Moundville and noted the rarity of the inclusion of white ibis identified in their sample.

Jackson and Scott (1995) note that in relatively unusual faunal assemblages such as the mound-top pit contexts of Moundville, when elements such as the teeth of dangerous predators and the wing elements of birds are present, the possibility should be considered that these are inclusions of ritual paraphernalia rather than food. Such is the case with Feature 25 which included the teeth of panther, shark, and dolphin, as well as roseate spoonbill, herring gull, and great blue heron only represented by wing elements. By these criteria, Feature 25 appears to be an assemblage out of the normal, but if white ibis are considered rare, and feature 25 shows the markings of the remains of a ritual feast, then how were these ibis used? For unlike other recovered bird taxa, ibis are represented by a full suite of elements.

They may have been collected simply for their parts rather than food. Serjeantson (2009) and Russell (2012) both note that birds parts feature prominently in Plains Indians sacred bundles. Both authors note that these bundles often include the skeletal elements of birds, but also that the skins of birds were commonly used as the bundle container. Had white ibis been processed only for their skins during this event, then we may expect to find more or less full skeletons as an end product. That the white ibis from Feature 25 were deposited as a sacrifice should be considered as another possibility for their inclusion in the pit. As mentioned in Chapter 3, ibis elements recovered in the assemblage showed no evidence of butchering or heat alteration. These taphonomic characteristics, however, do not offer smoking gun evidence for
sacrifice; as mentioned earlier, birds may be cleaned and cooked with minimal alteration to their bones (Serjeantson 2009).

Another difficulty in distinguishing sacrifice from consumption as the ultimate end of these birds is that these two practices are not mutually exclusive (Serjeantson 2009:336; Russell 2012:66-67). After all, animals that are sacrificed may be later eaten. The ritual significance in this animal could have been in the eating, as Jackson and Scott (1995:106-107) write, “the symbolism of certain animals extended beyond regalia to food consumption” through the belief that eating certain animals may have imbibed the consumer with the properties or qualities of the consumed. Given the cosmological significance of waterbirds hypothesized by many Southeastern archaeologists, as liminal creatures with the ability to traverse the three-tiered cosmos, could white ibis have been eaten by ritual specialists or others participating in mortuary activities associated with Palmetto Mound? Like Kitchell’s (2010) interpretation of Basketmaker shamans assuming bird qualities to guide the deceased into the afterlife, could this have been part of the burial rites, not only tending to the burial of the deceased but also ensuring safe passage to the afterlife?

Recommendations for Future Work

Nerissa Russell (2012:8-9) writes that, “treating animals solely as sources of protein and calories produces incomplete interpretations that focus on a narrow sphere of human life,” and zooarchaeologists who ignore the complex interactions between humans and animals, and the various power relations “enacted through animals and their products,” do so at their own peril. As I have attempted to demonstrate in this thesis, the interactions between humans and animals extend beyond simply means of
subsistence. This is not to say that ritual practice should be the assumed cause of every archaeological deposit where animal remains are found, but by carefully considering the context of archeofaunal assemblages at multiple scales through an interpretive lens that features less biology and more anthropology, zooarchaeologists have the opportunity to contribute greatly to the study and understanding of ritual and religion and how they played a part in the lives of people in the pre-Columbian past.

As the analysis for this thesis began, the presence of white ibis and other waterbirds in Feature 25 stood out as unique among analyzed faunal assemblages from throughout the greater region as well as within the site itself. Although results are forthcoming, as more of the vertebrate fauna assemblages are analyzed from other pits excavated in the same block excavation at Shell Mound, it is becoming clear that bird remains are not in fact unique to Feature 25, but seem to occur with some frequency in nearby features as well. If white ibis are to be considered symbolic animals to native peoples of the Southeast, as Jackson and Scott (2003:567) suggest, their presence should be noted as significant when identified in other contexts.

If white ibis were as plentiful and seasonally dependable around the Cedar Keys as the data presented in Chapter 4 suggests, then as investigations proceed within the study area of the Lower Suwannee Archaeological Survey, a future research question would be to find out whether ibis remains are present at other nearby coastal sites not yet excavated. If they are recovered at other sites, do they appear in similar pit contexts as those at Shell Mound; and if so, how do the ages of the specimens and the relative frequency of certain elements compare with ibis from Feature 25? If they are in fact found to be unique to feasting or mortuary related contexts, then future reports of their
presence at contemporaneous civic-ceremonial centers within the greater region may help archaeologists to better understand how this animal related to the cosmology of pre-Columbian people and their treatment of the dead. In the event that future studies happen to reveal more instances of white ibis deposition similar to that found at Shell Mound, then concepts from archaeoastronomy being applied to other mound centers and cultural landscapes by authors such as Pauketat (2013), Romain (2015), and Sassaman (2012) may provide useful insight into how mound centers and the people that maintained, and periodically visited them, functioned along a ritual calendar.

**Conclusion**

Given the data presented in this thesis, the presence of nestling juvenile white ibis specimens in archaeological contexts should be considered robust evidence for interpreting the seasonality of their capture and subsequent deposition. I have argued, based on the identification of these specimens, the associated context, and the conclusion that Feature 25 was created in a single event; that people gathered at Shell Mound from around the region to take part in a large feasting event timed to the summer solstice. Therefore, the ritual use of white ibis at Shell Mound inferred from the results of Feature 25 is evidenced by the timing of the event for which they were collected.

According to Timothy Pauketat (2013:62) by constructing monuments on the landscape in relation to the heavens, ancient North Americans “align[ed] the movement of human bodies with those of the sun.” As the early summer sun appeared to inch northward along the western horizon with each passing sunset, people across a scattered landscape began to make preparations. For the residents at Shell Mound this
was a busy time, coordinating the collection of resources that in some instances required travelling considerable distances to access certain animals; constructing the large vessels used for preparing a feast; and a number of other activities geared toward hosting a gathering. For those who called elsewhere home, with each new day the increasing pull of Shell Mound would have drawn them along well-travelled paths accompanied by their family members and friends. In their possession were powerful items and perhaps the remains of their kin being transported to their final resting place in Palmetto Mound.

Soon the network of paths that brought people traveling by foot to Shell Mound converged for the final procession along the ancient dune arm. With the forests disappearing into the marsh as they made their way along the narrowing peninsula they would have encountered the sights, sounds, and smells of the gathering crowd. Making camp after the journey, new acquaintances were met, old ones rekindled, and the final preparations were made for the featured event. Then, while the sun appeared to come to a standstill in its cyclical movement across the sky, the crowd feasted within sight of their ancestors. Before it was over, a large pit was dug at the edge of the mounded shell, and into it were deposited the vessels used for cooking and serving and the animal remains consumed during the feast, along with ritual paraphernalia and items that held special significance and power. It was in that time and place that Shell Mound became more than a monument; it became a place where people experienced the convergence of worlds and forces.

Like the white ibis, whose liminal natural habits are believed to signify the ability to traverse the three-tiered cosmos, the people who gathered at Shell Mound acted out
their cosmologies through practices that collapsed the conventional boundaries of substances and entities. There at the edge of the sea, situated across from the cemetery on Hog Island, marine shell was brought from the underworld and piled onto elevated land; feasting remains and materials were placed into the earth; and Shell Mound connected the living with the ancestors in that moment when the ocean met the sky.
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