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Shell Analysis of the Burns Site

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Introduction

The Burns site (8BR85) is an archaeological site found on the Space Force Station at Cape Canaveral, Florida. Now home to bustling military base, this land was once occupied by several Native American tribes and cultural groups dating back several thousand years. It is believed that the Burns site, as well as the rest of the Banana River and St. Johns area, was occupied as far back as 7,300 years ago, and up until 1600 CE by the Ais tribe (Penders 2012).

This site, along with the Penny site (8BR158), allows researchers to conduct archaeological research that includes both test pit and test unit excavation. The goal of these excavations is to uncover as much as possible about how the people that occupied these sites used to live. This includes their culture, ideology, eating habits, and several other aspects of everyday life that can be representing materially in the archaeological record. The archaeological sites at the Cape Canaveral Space Force Station (CCSFS) are important because they are one of the last remaining areas that can tell the story of a group of people lost to history, as there are no current known descendants of the tribes that used to inhabit this area. Also, it is important to note that climate change is threatening the area as sea levels continue to rise. Experts believe that over the next few years these sites will no longer be above sea level, and the remains of these peoples will be lost forever (Xiao et al. 2016). After conducting excavations at the Penny site, and researching the Burns site, it is clear that one can find out a lot about the past inhabitant's way of life, especially the eating habits, reflected by bones and shells found in middens, or ancient trash deposits (Randall et al. 2014).

Diet in the Archaeological Record

Understanding the diet of a specific group of people through the archaeological record is essential for understanding the full scope of their everyday life. Diet can reveal the health patterns of a community as well as various challenges they may have faced in obtaining their food. Also, and perhaps most importantly, the diversity of a diet revealed in the archaeological record can display how successfully a group of people adapted to their environment. Typically, survival occurs where there is a diverse diet where more than one food source is relied on for precious calories (Fernandez-Lopez de Pablo et al. 2014).

Wherever people live, they eat, and leave behind evidence of the foods they consumed. When excavation takes place near what is known as a midden, or deposits of the remains of the foods people ate (Randall et al. 2014), archaeologists can interpret these artifacts and begin to gather data and draw conclusions on the diets that people had. In the case of both the Burns and Penny sites, there is clear evidence in the archaeological record of these foods represented by the countless number of fish, shark, turtle, bird, deer, and shell remains found in the middens. This of course represents a rich and diverse diet of animal protein, relying heavily on hunting and fishing, as well as the gathering of shell creatures. Test unit G at the Penny site contains mostly fish and shell remains. This is unsurprising as the site is no more than a kilometer away from the water.

While explaining the benefit of excavating middens, it must be noted that what is found in the midden is only what was discarded. For example, excavators found a large number of fish vertebrae and turtle shell, meaning that other parts of the fish and turtle were either consumed or put to other use, while the shell and vertebrae were discarded. This thought process must also be applied to the midden as a whole when analyzing the diet of the native people. Perhaps the

remains of not everything they ate made it into the midden, providing a distorted image of what their diet consisted of. However, even with acknowledging this possible flaw in excavating the middens, it is the best tool researchers have for uncovering the diet of a people that is no longer around.

Importance of Shells

When excavating middens, it is often difficult to identify the species of fish by remains such as vertebrae, as the bones are often small and do not differ much between species. Also, the revealing scales, fins, and colors of the fish are not left behind on the skeleton, making it even more difficult to identify the species of fish. However, shells differ from fish in this way. Identifying shell species are significantly easier as often times the outside of the shell is preserved. This is because the clams, oysters, snails, and mussels found in shells are eaten and the shell discarded. These shells contain distinct markings, patterns, and colors associated with specific species that can inform archaeologists of the exact species of shell-dwelling animal that people in the area were consuming.

Differing from modern people, who often overlook shell dwelling creatures in day-to-day diet, the indigenous peoples of coastal Florida relied heavily on marine resources for food, especially shell dwelling creatures (Milanich 2021). The shells excavated can be identified to represent specific species that researchers know were in the area at the same time period as the tribes and gather a fairly accurate view of the community's shellfish diet. Understanding this diet allows archaeologists and anthropologists to get a better view of what life was like for the

indigenous people that inhabited the place of excavation, in this case, the Cape Canaveral and St. Johns area on the Eastern coast of Florida.

Research Methods

Archaeological excavation was conducted at the Penny site (8BR158) during the Cape Canaveral Archaeological Mitigation Project (CCAMP) Season 6 (2022), where several aspects of past culture and diet were uncovered through faunal remains as well as ceramics. However, in terms of the in-depth shell analysis that took place, samples were drawn from CCAMP Season 2 (2018) from the Burns site (8BR85). Specifically, these samples were recovered from test units B and E of this site. With one of the samples analyzed being taken from levels 1 and 2 (0-20 cmbd) of test unit B, while the other two samples were taken from level 3 (20-30 cmbd) and level 4 (30-40 cmbd) of test unit E. It is important to note the depth at which the samples were taken as varying results between levels may indicate a cultural change in diet patterns across different time periods of occupation. This can be inferred from the law of superposition which states that older sediment, if left undisturbed, will be found at a lower depth than newer sediment (Rieppel 2011). This means that older evidence of human occupation will be found at a lower depth than newer artifacts.

The goal of this research was to properly identify the several shell species found in the shell deposits, then count and weigh each species in relation to the others to get information on the types of shellfish the native people ate, and how frequently they ate each species. In order to properly identify each species, large collections of donax shells, taken from the middens, were laid out and sorted carefully using tweezers and other tools. All of the items found in the deposits

that were not donax shells were separated into individual piles to be properly identified, weighed, and counted. After weighing and counting each species the results were analyzed to determine if there were any patterns within the eating habits of this tribe in relation to shell creatures.

Results

After all of the byproduct from the donax shell collections were identified, counted and weighed, the data was collected and percentages were calculated from this data. The number of remains from a particular species was counted and divided by the total number of other remains found to determine how much of the concentration contained a specific species. This was also done with weight to determine how heavy each species was in relation to the whole. It should be noted that the majority of the by product from the samples were fish remains. However, in this case, only the shell was analyzed. The most notable results from each unit are as follows.

Name	NISP	NISP%	Weight (g)	Weight (g)%
Calico Scallop	22	23.40%	9	13.85%
Carolina Marsh	13	13.83%	6	9.23%
Atlantic Ribbed Mussel	14	14.89%	5	7.69%
W.I. Top Shell	6	6.83%	16	24.62%
Cut-Ribbed Ark	6	6.83%	3	4.62%
Southern Quahog	6	6.83%	7	10.77%

Figure 1. Shell frequencies found in Test Unit B, levels 1 and 2 (0-20 cmbd)

In Test Unit B of the Burns site (Levels 1 and 2) there was a total of 94 individual shell specimens apart from the donax shell. The combined weight of all the specimens was 65 grams. The callico scallop had the greatest number of specimens in the sample with 22 (23.4%) but only made up for less than 14% of the total weight. This can be compared to the West Indian top shell species that only had 6 specimens but contributed to 24.62% of the total weight. This shows that despite the callico scallop having so many more specimens in the sample, and therefore was likely eaten more frequently, it appears that the majority of the calories from shell dwelling creatures can be attributed to the West Indian top shell, which is home to a type of large and nutritious snail (Abbott 2014). It should be noted that not all of the species found in the sample are represented in this table as many species such as the Atlantic oyster drill or lunate crassinella, only had a couple of specimens and attributed to a miniscule amount of weight. The cut-ribbed ark and southern quahog are included in the table because of the unusually low frequencies compared to the other test unit samples. In this sample from test unit B both species only had 6 specimens and only contributed to less than 10 percent of the overall weight.

Name	NISP	NISP%	Weight (g)	Weight (g)%
Cut-Ribbed Ark	62	48.82%	20	33.33%
Common Star Turrid	15	11.81%	11	18.33%
Transverse Ark	12	9.45%	6	10%
Southern Quahog	22	17.32%	12	20%
W.I. Top Shell	2	1.57%	<1	<1.67%

Figure 2. Shell frequencies found in Test Unit E, Level 4 (30-40 cmbd)

In test unit E of the Burns Site (level 4) there was a total of 127 individual specimens consisting of a total weight of 60 grams. In unit E, at this depth, most of the specimens other than the donax are the cut-ribbed ark clam, making up nearly half of all the shell byproduct and also weighing the most at a third of the total weight. This is a significantly higher frequency and weight for this species compared to unit B. The southern quahog also appears at a much higher frequency compared to test unit B following the same trend as the cut-ribbed ark clam. However, what is strange is that the West Indian top shell in this unit only accounts for less than 2 percent of the total weight. This is completely different from test unit B where the West Indian top shell specimens were the heaviest. This is because in this sample from test unit E the opercula were found opposed to the much heavier exterior of the shell as was found in Unit B.

Name	NISP	NISP%	Weight (g)	Weight (g)%
Common Star Turrid	28	29.47%	32	47.76%
Cut Ribbed Ark	43	45.26%	20	29.85%
Transverse Ark	5	5.26%	5	7.46%
Kitten’s Paw	4	4.21%	7	10.45%
W.I. Top Shell	12	12.63%	1	1.49%

Figure 3. Shell frequencies found in Test Unit E, Level 3 (20-30 cmbd)

In level 3 of test unit E of the Burns site there was a total of 95 individual specimens found in the donax sample, making up a total weight of 67 grams. Similar to level 4, the most popular shells of level 3 are the common star turrid and the cut-ribbed ark clam. There is also a similarity in that there were more cut-ribbed ark specimens yet the common star turrid shells are

responsible for much more of the weight, making up nearly 50 percent of the sample's weight. Another aspect of this sample resembling level 4 is that there was West Indian top shell opercula found. However, in level 3 there were far more specimens (12), yet the weight was very similar in both levels as the opercula of these shells are very light, a collection of them barely reaching a gram. Level 3 of unit E also contains a new species, kitten's paw, making up over ten percent of the weight. This is a compact, colorful, and ribbed shell not found in the other samples.

Discussion

After comparing the data between the different levels and units, it is clear that there are many similarities and differences between the types of species, number of specimens, and weight of the specimens in each sample. There are a few patterns that must be acknowledged when analyzing this data. Firstly, the number of total specimens between the samples were relatively similar, with level 4 of unit B being the outlier but still falling within 25 of the other two samples. Also, the total weights were very similar with all of the byproduct from the donax samples falling within 7 grams of each other.

When analyzing the differences, it is clear that there are far more differences between the samples of units B and E than between the levels of unit E. The first difference is that two of the three most popular shells in unit B, the calico scallop and the Carolina marsh clam, do not appear in either levels 3 or 4 of unit E. Also, one of the most common shells in both levels of unit E, does not appear at all in test unit B. This is likely due to the fact that, despite only being a few meters apart, these specimens came from separate units. Although these units came from the same site, perhaps different feasting activities occurred in the different places the units were

excavated. However, it must be noted that the shells in test unit B are coming from levels 1 and 2 (0-20 cmbd), while the samples from test unit E are coming from deeper levels (3 and 4). This could possibly be the reason for the differences.

Another shocking difference between units is that while Test Unit B had very little cut-ribbed ark clam, only 4.62% of the overall weight, the levels from test unit E seem to be teeming with this species, making up nearly half of the specimens in their own levels. Again, this is possibly due to the difference in unit or time period corresponding with the levels, more samples and specimens would need to be analyzed to get a better understanding.

Figure 4. Cut-Ribbed Ark Clam

The final overwhelming difference is the weight of the West Indian top shell between units. In unit B, despite only having 6 specimens, this species of snail was by far the heaviest where a lot of the heavy exterior shell was collected. However, in test unit E, the lighter opercula were found instead of the heavy exterior. The operculum is the light and fragile covering to the shell opening (Abbott 2014). It is perplexing that this was found in unit E, but another portion of the shell, the hard exterior, was limited to unit B.

There are a couple of possible explanations for these differences. A possible source of the deferring samples could be due to the location of the test units. Because the units were dug in

separate areas of the site, it is possible the inhabitants performed different tasks at these specific areas, which is why the results vary widely between units. However, this may not be likely as despite being dug in different locations, the units were still dug at the same site only meters from each other. Another possible explanation would be due to the different time periods expressed by the differing levels of excavation. Perhaps there is more cut-ribbed ark in test unit E because it came from levels 3 and 4, and the reason there is not as much in levels 1 and 2 of test unit B is because the shell was used less and less as time went on. Again, more research needs to be conducted to get a better understanding of these patterns.

Conclusion

Diet is one of the most important components to understanding a past peoples' way of life. Shells are a great way of interpreting this diet as one can directly identify the species and the quantity of each species in the middens. Although shells alone do not depict a complete picture of the entire diet, this data can be compared to faunal remains to infer the entire carnivorous diet of this culture. Overall, it is clear that different remains were found in separate test units. Using this information, archaeologists can conduct research to try and find out why these results were different, perhaps due to specific rituals taking place in the area where the units were dug. Also, possibly environmental factors, such as species fluctuation throughout time. Whatever the case may be, more testing and more samples need to be drawn to get a more complete picture of why the results between units, but not levels, varied as much as they did.

Shells and faunal remains can tell stories about the indigenous peoples of Eastern Florida, and unfortunately, climate change is threatening the coast, and in the near future these sites will

be lost (Xiao 2016). It is up to archaeologists to continue to conduct productive and ethical research in this area to inform the public of the indigenous peoples that use to live there. As they are no longer around to do it themselves, it is up to researchers to do them justice.

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