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Functional Analysis of Weeden Island Pottery from Bayou St. John

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Functional Analysis of Weeden Island Pottery from Bayou St. John

By

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I would like to dedicate this to my mom and dad, Angela and Hugh Talbert, without their constant support, encouragement, and listening ears I would not be where I am today. My mom, specifically, thank you for proof reading, providing feedback, and encouraging me from a young age to pursue what I love. My dad, thank you for being my biggest supporter and encouraging me. I wish you could be here to read this, but I know that you were so proud of me and my accomplishments.

I would like to acknowledge Dr. Carr for all of his help, advice, feedback, encouragement, and constructive criticism throughout this process. Thank you for working with my shortened timeline and answering my questions. I would also like to thank Dr. Nelson for teaching me how to accomplish a pottery analysis, providing constructive criticism, helping me get started, and answering my many questions. I would also like to thank my committee member, Dr. Burns for her feedback, advice, and willingness to join my committee on a shortened time frame. I would not have been able to accomplish this without them.

Abstract

Analyses of Weeden Island culture and Tate's Hammock phase pottery are sparse throughout the literature and tend to adopt a culture historical approach. This study uses pottery sherds from the Bayou St. John assemblage to conduct a functional analysis in order to determine what food related activities took place at this site during the Tate's Hammock phase and Weeden Island culture. By comparing vessel form with orifice diameter, temper material and size, and a subassemblage that was likely connected to mound activities, this study was able to determine multiple patterns. Cooking and storage vessels were the most common vessel forms identified in the assemblage. The most frequent temper material amongst the assemblage was sand and the majority of the assemblage had fine-medium sized temper. Within the subassemblage, cooking, storage, and serving vessels were the most common vessel forms, sand was the most common temper material, but the temper size tended to be finer. These findings suggest that cooking and storage were the most common food related activities during the Tate's Hammock phase, but that serving was more frequent near the mound.

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Introduction

The archaeological site Bayou St. John, located in Gulf Shores, Alabama, underwent an extensive excavation in 2007, and produced a wealth of artifacts from the Woodland period (700 BC-AD 1000) and specifically the Weeden Island culture. Archaeological evidence from other sites indicates that the Woodland period was a time of population growth, increased pressure on food resources, and increased status differences among Native American groups (Anderson and Mainfort 2002). Due to the high volume of artifacts in this collection from well dated contexts, it is an opportunity to generate new information about the Late Woodland period and Weeden Island culture in Coastal Alabama. Samples for this research were selected from radiocarbon dated features that belonged to the Tates Hammock phase, the period of primary occupation of the site (Dumas 2009: 116). This study's intentions are three fold: to develop an understanding of the range of vessel shapes and sizes in the Tates Hammock assemblage, looking for patterns in regards to different cooking or eating activities, and compare it to previous research; to look for patterns when comparing vessel temper to vessel shape within the overall assemblage; to compare the overall Tate's Hammock assemblage with a subassemblage found in a large pit feature that is likely related to mound activities.

Woodland Period

The Woodland Period dates from 700 BC to AD 1000 and it was marked by the beginning of the widespread use of pottery, increases in sedentism and population, and changes in social organization in the Southeast United States (Anderson and Mainfort 2002; Steponaitis 1986: 378). Archaeologists have subdivided the Woodland period into Early, Middle, and Late. No Early Woodland artifacts are present in this assemblage. The Middle Woodland period spanned

from around 200 BC to AD 400 and was characterized by important changes in status differences and communication with other groups. The majority of communities during this period were small and people resided in circular or oval homes. They also began to construct burial mounds, share artifacts with other communities, and use a common iconography across the Southeast (Anderson and Mainfort 2002: 9-10; Steponaitis 1986: 380). The Late Woodland Period dates around AD 400 to 1000 and was also a time of further change in the Southeast. The population continued to increase, and households and communities moved across the landscape. There was an increase pressure on food resources due to the population increase, adoption of the bow and arrow were introduced, and there was an increase in warfare in some areas. There was also an increase in mound construction in the Gulf Coast region (Anderson and Mainfort 2002: 15-16; Steponaitis 1986: 384, 389).The Mississippian period began in AD 1000 and ended in AD 1700, during which they built platform mounds for the residences of the elites, manufactured shell-tempered pottery, used civic ceremonial centers, and conducted intensive farming of maize (Anderson and Mainfort 2002; Steponaitis 1986: 387-390).

Weeden Island Culture

The culture, or group of people that share traditions, beliefs, and ideology, primarily present at the Bayou St. John site was the Weeden Island culture during the Late Woodland period (figure 1). Generally, the distribution of this culture spans across the Gulf Coastal Plain of Alabama, Georgia, and Florida. More specifically, Weeden Island ceramics have been found from the Chattahoochee- Apalachicola drainage to Mobile Bay and even the Tombigbee River. It extends north along the Chattahoochee River and as far south as Sarasota County, Florida.

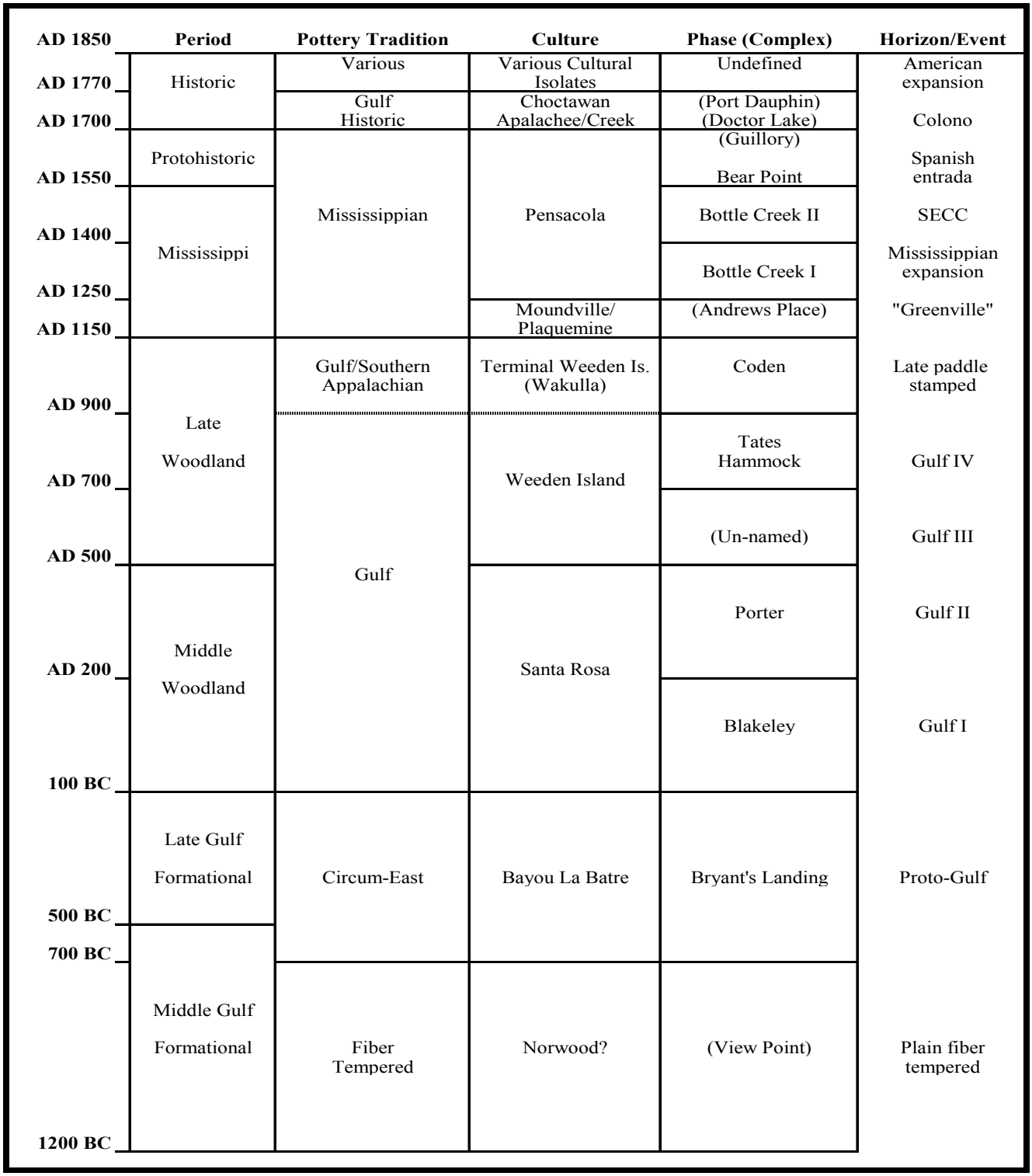

Figure 1. “Indian Cultural chronology for the Alabama coast, 1200 B.C to A.D. 1850.” (Fuller 1998)

occasional sherds are found on the coastal plain of South Georgia and southeastern Alabama.

Evidence from sites such as Kolomoki, Fairchild's Landing, and Aspalaga have been uncovered to propose the origin of Weeden Island. Archaeologists suggest that Weeden Island transitioned from Swift Creek culture to Weeden Island culture around A.D. 200 in the lower Chattachoochee- Apalachicola river drainage (Milanich et al. 1997: 10). Weeden Island is also known as a complex culture with incredible pottery (Willey 1949: 406

Weeden Island culture has been divided into Weeden Island I and Weeden Island II based on changes in pottery form and decoration (Anderson and Mainfort 2002: 16; Willey 1949). Weeden Island I spanned from A.D. 250-700; it has fewer sites than the following phase and ceramics consist mainly of punctated, incised, plain, and complicated stamped decorations. Weeden Island II spanned from A.D. 700-900/1000 and has also been called a proto-Mississippian period, because it was a transition period from the Weeden Island I culture to Mississippian. Ceramics from this period consist mainly of plain and check stamped decorations (Milanich et al. 1997: 11). According to Willey (1949: 406) the most common Weeden Island pottery was often sand tempered, buff or gray in color, and rarely slipped and instead polished.

In Willey's (1949: 406-407) synthesis on Weeden Island he reported that pottery vessels were primarily intended for storage, eating, drinking, and ceremonies, not cooking. Overall, vessels tended to be small and shaped into collared jars and flattened globular bowls. The majority of cooking vessels were large open bowls or deep, rounded pots. There was also a large number of funerary vessels created during this period (Willey 1949: 403).

Tates Hammock Phase

Progressing from the earlier Porter phase, the Tates Hammock phase began in AD 400

and lasted until AD 750. It is identified by Weeden Island decorative styles and vessel shapes. Rectilinear neck decoration is the primary trademark of the Tate's Hammock phase and, generally, sand tempering became more common than grog tempering (Fuller 1998). This information serves to demonstrate the specific style, within the Weeden Island culture, that was in use while Bayou St. John site was primarily occupied, according to Dumas (2009).

McKeithen Site

Not many Late Woodland sites have been excavated using modern techniques, so there is only a small number of sites and information to compare to the Bayou St. John site (Price and Waselkov, 2009). One of these sites is the McKeithen site located in North Florida, excavated by Timothy Kohler. The soil throughout the site was sand or sandy loam and the site is located amongst a band of lakes and ponds. The site was occupied during the Weeden Island culture, and the majority of ceramic samples were characteristic of Weeden Island I (A.D. 250-700). Three mounds were discovered on the site, which form an isosceles triangle. The mounds have been connected to ritual activities based on location of the mounds, a human burial, and ceramics. One of the mounds allowed for a direct line of sight of the rising sun for the summer solstice. The same mound contained a human skeleton buried in a tomb. The skeleton was a male in his 30's that had a projectile point lodged in a bone, which had been there for about 3 months and was the cause of an infection, likely his cause of death. An effigy head of a turkey vulture, bones from other humans, and elite pottery types were buried with the man (Milanich et al. 1997: 91, 109-112). Milanich at al. (1997: 160- 162) argued that the ceramic assemblage at one of the mounds is more utilitarian than the other two based on vessel types, forms, evidence of use over a fire, and source of clay, which highlights the sacred ceramics at the other two mounds. They also

found about two borrow pits near the two mounds that Milanich et al. (1997: 93) considered to be ritual related mounds, but none near the utilitarian mound. Artifact distribution follows the shape of the mounds, showing the living areas of the site and a plaza in the middle (Milanich et al. 1997: 91).

Overall, ceramic sherds belonged overwhelmingly to the Weeden Island culture. A total of 366 large rims sherds were selected for an analysis of thirty-two attributes, which cover details, such as, vessel form, decoration, surface characteristics, color, and paste characteristics. Generalized vessel forms included plate, bowl, dish, jar forms, and vases. Measurements were taken of wall and lip thickness, orifice diameter, vessel depth, punctation size and spacing, etc. Milanch et al. used the thirty-two attributes to determine a sacred ceramic series, or pottery types used for restricted goods, special status, or special purposes (Milanich et al. 1997). In contrast to Milanich's focus, a portion of this study analyzed vessel orifice diameter and form to interpret function in terms of cooking, storage, and serving vessels.

Materials and site

Bayou St. John Site

The Bayou St. John site, 1BA21, is located in Orange Beach, Alabama on two tracts of land slated for development. The best evidence indicates the original discovery of the site occurred in 1901 by C.B. Moore, and a 1933 visit is confirmed. Around that time, homes were built on the site, during which residents dumped their trash, landscaped the site, and drained their sewage. However, despite these activities, much of the site remained well preserved for archaeologists to later excavate (Price and Waselkove 2009a: 1).

Archaeologists conduct Cultural Resource Management investigations that vary by intensity. Phase I surveys serve to identify if a project area contains archaeological resources by surface collections and shovel testing and acts as one of the most important phases. Phase II functions to complete a preliminary test and evaluation to further determine the significance of the site. Phase III is conducted when phase I and phase II inquiries reveal that the site is eligible for listing on the National Historic Register. During this final phase, archaeologists conduct a full excavation of the site that is being threatened (Neumann et al. 2010: 2, 93, 135).

A Phase I survey was conducted on the west tract (figure 2) and a large quantity of artifacts, mainly fish and shellfish remains, were recovered. Due to the amount of faunal remains and intact subsurface deposits, the site was recommended for Phase III excavations, and they began in 2004. Next, Phase I excavation of the east tract was completed in 2005, which recovered over one thousand pottery sherds. Again, due to the large quantity of artifacts yielded and intact subsurface deposits, the site was recommended for a Phase III excavation, which was completed in 2007. Archaeologists decided to do a total mitigation of both tracts, because the site would be destroyed by development (Price 2009a: 45- 47). They used backhoe trenches to gain an understanding of the stratigraphy, features, and where to conduct hand excavations. Hand excavations were carried out on multiple 2 x 2m sample units on both tracts of land to examine midden deposits and subsurface features, also to recover samples for radiocarbon dating, faunal analysis, and plant remain analysis. The remaining areas of the site that were not excavated by hand were stripped by a tractor-mounted box blade to look for features and human burials; because, uncovering of human burials would require archaeologists to approach excavations differently. Feature excavation of postholes and pits was by hand and matrix was screened through 1/16-inch mesh. Samples also were collected for flotation processing (Price 2009a: 50-

54p). The west tract portion of the site produced 36,374 pottery sherds and 52,104 sherlets, or sherds smaller than ½ an inch (Dumas 2009:94).

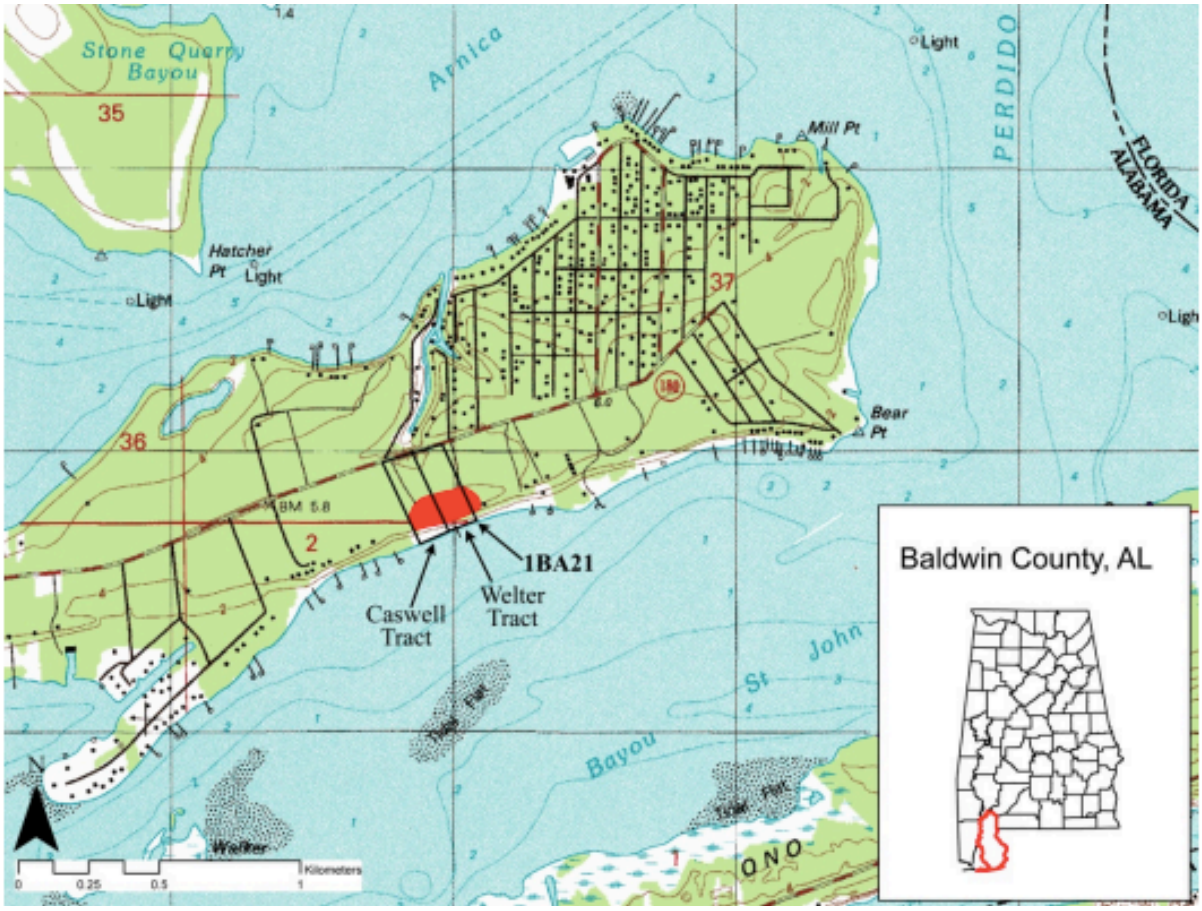

Figure 2. "Location of the Bayou St. John site, 1BA21, on the Orange Beach, AL, 7.5' USGS quadrangle." (Price and Waselkov 2009a)

Excavations revealed the site was primarily occupied during the Late Woodland period, around AD 600 to 1000, and the majority of the pottery belongs to the Weeden Island culture (Price and Waselkov 2009a; Dumas 2009) There is also a small amount of Middle Woodland (200- 400 AD) and Mississippian (1000 AD- 1700) pottery found, which showed people were present at Bayou St. John site during a fairly long span of time (Anderson and Mainfort 2002: 9; Dumas 2009; Steponaitis 1986: 387).

Faunal remains from the site showed that the diet at Bayou St. John relied heavily on bony marine fish, primarily mullet, sea catfish, sheepshead, drums, and jacks. Deer, turtles, snakes, birds, and other terrestrial mammals are present, but appear to be supplemental to the diet (Baker and Klippel 2009: 268, 272; Orr 2007: 212) There was also a large amount of worked bone tools that were primarily made from white tailed deer bones into different forms of awls and spatulas (Price and Waselkov 2009b: 149, 151). The archaeobotanical samples of 1BA21 contained a large majority of wood, mainly pine and oak, and a small amount of plant food. The most common plant food found was hickory nutshell, followed by acorns, and then black walnuts. Some seeds were also recovered and included Chenopod, grape, persimmon, desmodium, purslane, wild cherry, and bedstraw (Leone and Mickelson 2009: 178, 180-182, 186, 189-192).

Excavations uncovered five hundred features, which were divided into major types, based on shape, size, and contents: borrow pits, roasting pits, hearths and associated features, pits, posts, and others. Of particular interest to this study is the borrow pits, Features 23 and 106. These two borrow pits are large, 17 by 5 m in planview, and over 1 meter deep. They were filled with shell, bones, broken pottery, and bone tools and there are well defined layers that show three major instances of deposition. The two features are located near a mound that was previously excavated, which is why they were thought to be connected to mound activities. They discovered five roasting pits, 18 hearths and associated features, 196 pits, 162 posts, and 45 features that are classified in the other category (Price 2009b: 69- 85).

Previous Research at Bayou St. John

Previous research conducted on a portion of the Bayou St. John assemblage was

accomplished by Ashely Dumas (2009: 94), where she selected a sample of sherds from contexts that were radiocarbon dated and had a faunal and plant remain analysis. Dumas' work included 614 rim sherds and the analysis identified vessel form, rim form and decoration, orifice diameter, presence of soot or other residue, and evidence of possible wear. She sought to determine whether the Tate's Hammock phase is contemporary with the Porter phase or if current knowledge should be adjusted, as well as providing a description of the assemblage. Dumas found that Bayou St. John's primary occupation was during the Tate's Hammock phase, but it also had a small overlapping Porter phase occupation (figure 1) (Dumas 2009: 116). Dumas also recorded a large number of sherds from small bowls that had evidence of sooting. (Dumas 2009). This provides some preliminary information about the collection, such as, if people at Bayou St. John were using a large number of small bowls, this could indicate what sort of activities they were doing. Also, evidence of sooting indicates that they were cooking directly with a fire.

The artifacts produced at Bayou St. John provide an opportunity to learn more about the Weeden Island culture in Coastal Alabama. Pottery remains will provide insight into their foodways. By learning more about this site, this research will be able to contribute a new perspective, methods, and information to the current knowledge of Weeden Island and Tates Hammock culture sites.

Methods

A pottery vessel may have been used to accomplish multiple tasks, but a functional analysis can identify the general use of a vessel (i.e. cooking, storage, serving) (Braun 1980; Hally 1986; Kassabaum 2015). In order to accomplish this, the shape and size of the vessel must be known. Based on vessel shape and size, there are two common measures of vessel function: frequency of

access and degree of containment security. Frequency of access (FA) is the "volume of material that may pass through the vessel orifice [or opening] per unit time" (Braun 1980: 172). Therefore, a vessel with a narrow orifice has a low FA and a vessel with a wide orifice has a high FA. Degree of containment security (CS) is the "ability of a vessel to hold its contents without spilling due to either depth or rim angle" (Braun 1980: 172). A shallow and unrestricted vessel has a low CS and a deep and restricted vessel has a high CS (Braun 1980: 172). There are three general vessel categories that are relevant to this analysis: storage, cooking, and serving, which can be identified using the above measurements. A storage vessel has a low FA and high CS, a cooking vessel has a high FA and a high CS, and a serving vessel has a high FA and a low CS (Braun 1980; Kassabaum 2015: 7). Using this information, a functional analysis can be used to infer the general function of a vessel based on its shape and size. We can further use this to look at what type of vessel is most common, which might be able to give us an idea of what food related activities were taking place.

Prehistoric potters would add temper into clay in order to make it easier to work with while plastic, bind the clay particles while drying, and make the vessel more resistant to cracking and breaking (Braun 1983: 122; Bronitsky and Hamer 1986: 90). Archaeologists are able to examine temper within pottery to get an idea of the possible function of a vessel by looking at attributes, such as, temper material and size (i.e. fine and coarse) (Braun 1983; Brontisky and Hamer 1986; Hally 1986; Steponaitis 1984). Research has found patterns in pottery vessel temper that relate to common sources of vessel failure: thermal stress and mechanical stress. Thermal stress occurs from thermal shock, when the vessel is exposed to very high heat and is quickly cooled, which commonly occurs with cooking, or from differed expansion or reduction reactions by temper and vessel paste to heat exposure (Braun 1983: 123; Brontisky and Hamer 1986; Steponaitis 1984:

92). Mechanical stress occurs from use or accidental dropping of the vessel after being fired (Brontisky and Hamer 1986; Steponaitis 1984: 92). When a vessel is exposed to thermal stress it can form cracks in two ways: initial cracking, when cracks form, and crack propagation, when cracks spread and enlarge. When a vessel is better able to resist crack propagation, it will have a longer use life (Braun 1983: 123; Steponaitis 1984: 108). They have found that vessels with finer temper are better able to withstand mechanical stress and initial cracking when exposed to thermal shock than coarse temper (Braun 1983: 123; Brontisky and Hamer 1986: 97; Steponaitis 1984: 108). Steponaitis (1984: 108) and Braun (1983: 123) found that coarse tempered vessels were more resistant to thermal stress overtime and crack propagation than fine temper. Steponaitis (1984: 108) concluded that coarsely tempered pots were best suited for cooking as it would have been more durable and had a longer use life. Brontisky and Hamer (1986: 96) found that fine tempered vessels were more resistant to thermal stress than coarse temper, but these differing results can be attributed to their research methods, which were vastly different than Steponaitis's.

Evidence from the McKeithen site implied that the two mounds related to non-utilitarian or ritual activities had two borrow pits nearby the mounds. Ceramics found around the mounds were sacred or non-utilitarian types (Milanich et al 1997: 160- 161). Excavations at Bayou St. John revealed a large borrow pit that is believed to be near a previously excavated mound. There could possibly be a pattern present of borrow pits near mounds that contain sacred or non-utilitarian types of pottery.

All samples chosen for this analysis are rim sherds and were selected from radiocarbon dated features that all belong to the Tates Hammock phase. This includes two large pit features, which are likely connected to mound activities, as well as another pit, a shallow basin shaped pit, and

an isolated earth midden (Price 2009b). This study used data collected by Dumas (2009) for 619 rim sherds, and an additional 67 rim sherds from unanalyzed contexts, for a total of 686 rim sherds. Of these, 250 had identifiable vessel form and measurable orifice diameter. Only rim sherds with at least five percent of the vessel's circumference were included, because smaller sherds do not have enough curvature to be accurately measured. As a caveat, using sherds with five percent or more of the circumference could affect the results, but with the present methods it is necessary. Future analysis of this assemblage could include the sherds excluded to eliminate any bias. This analysis used rim sherd orifice diameter and form, temper material and size to find patterns in the overall assemblage and compare those to patterns found in the subassemblage.

Measurements of orifice diameter were accomplished by using a standard rim diameter and percentage chart. Vessel form was identified by analyzing the profile of the rim sherd and determining which vessel form category it best fit, based on Dumas's vessel form code sheet (figure 3).

Temper was determined in this assemblage by looking at the sherds with a blind eye and an eye loupe. For this part of the analysis, all sherds from the assemblage are included, except those that vessel form was not able to be identified, which resulted in 379 sherds.

In order to compare the subassemblage (n=196) from the large pit feature, which is believed to be connected to a mound previously excavated at the site, with the overall assemblage, data including orifice diameter, vessel form, and temper were collected and then compared. This analysis sought to determine any patterns in vessel form, size, and temper within the two contexts but comparing in three ways: 1) compare the frequency of vessel forms in the subassemblage and those outside of the subassemblage; 2) compare vessel forms and orifice diameter to determine if vessel forms had differing orifice diameters; 3) compare temper material

and size in sherds in the overall assemblage and in the subassemblage. Comparison 1 used sherds that had an identified vessel form. Comparison 2 used sherds that had a known vessel form and orifice diameter. Comparison 3 used sherds that has an identified vessel form, temper material, and temper size.

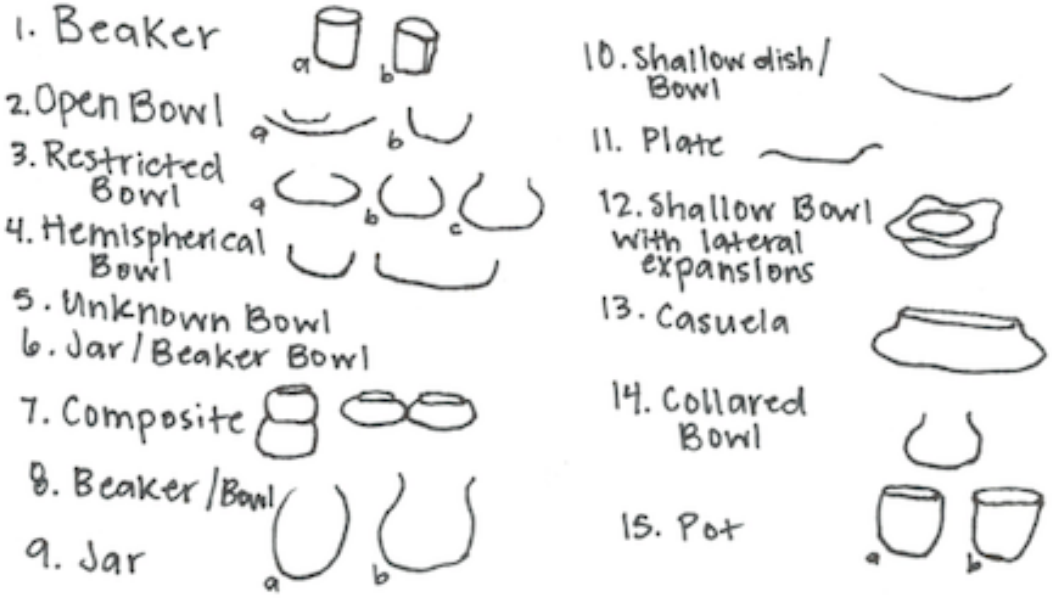

Figure 3. Ashley Dumas' Code Sheet for Orange Beach Ceramics

Results

Vessel form and orifice diameter

Dumas's vessel form codes included fifteen vessel forms: beaker, open bowl, restricted bowl, hemispherical bowl, unknown bowl, jar/ flared bowl, composite, beaker/ bow, shallow dish/ bowl, plate, shallow bowl with lateral expansions, casuela, collared bowl, and pot. She further divided five categories into sub-categories: beaker, open bowl, restricted bowl, jar, and pot. The most common vessel form in the Tates Hammock assemblage was restricted bowls (n= 133). The second most common vessel form was collared bowls (n=34). The third most common vessel form was jars and pots (n=28). Jars and pots illustrated in Dumas's code sheet both have a

high FA value and high CS values; therefore, they were combined due to their similar shape (figure 3) and function.

The high amount of restricted bowls in this assemblage can indicate what food related activities took place at Bayou St. John but based on Dumas's code sheet there are sub categories within restricted bowls that call for a deeper analysis. Within the restricted bowls category there are three sub categories that are based on the constriction of the orifice, the height, and the angle of the rim. These vessels are labeled as A, B, and C. Restricted bowl A (n= 38) is a short and flattened restricted bowl with a smaller orifice. Restricted bowl B (n= 58) is a taller and globular restricted bowl with a wider orifice. Finally, restricted bowl C (n= 37) is similar to restricted bowl B in that it is taller and more globular, but it has a very small and slightly flaring lip. Despite all being restricted bowl forms, their vessel height and orifice constriction could indicate different vessel functions.

Out of the three sub-categories, restricted bowl B was the most common with 58 vessels. The rim diameter spanned from 6 to 28 cm and seems to have two common sizes classes from 12-13 cm and 16-21 cm (figure 5). Restricted bowl A had the second highest number of vessels with 38. It appears to have a primary rim diameter around 14 or 15 cm with some vessels smaller and some larger (figure 4) and had an overall range of 7 to 22 cm. With only one less vessel, restricted bowl C had 37 samples. It seems to have a smaller orifice diameter size than A and B, as had a primary size class of 9 to 13 (figure 6). It also has an overall range from 6 to 28 cm.

Looking at an overlay of the graphs of restricted bowl A, B, and B (table 1 and figure 7), A had the smallest overall range orifice diameter range and its most common diameter was 14 to 15 cm. Restricted bowl B had the largest orifice diameter range and its most common orifice

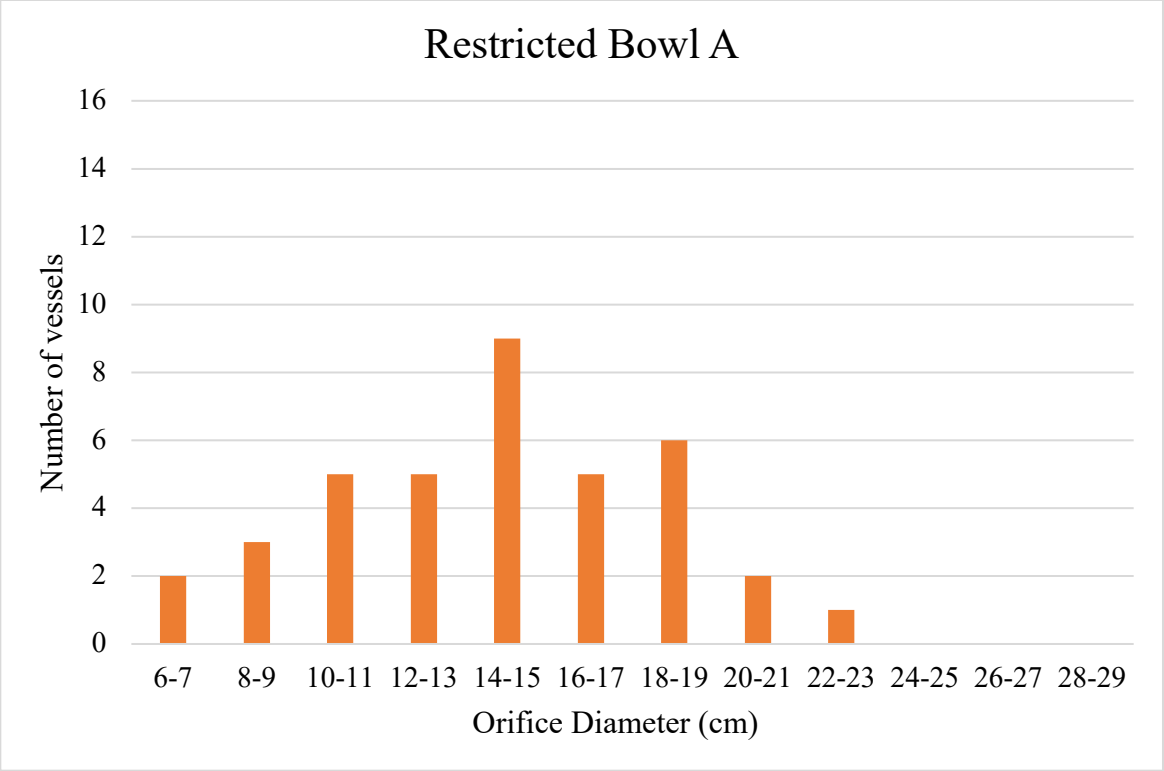

Figure 4.

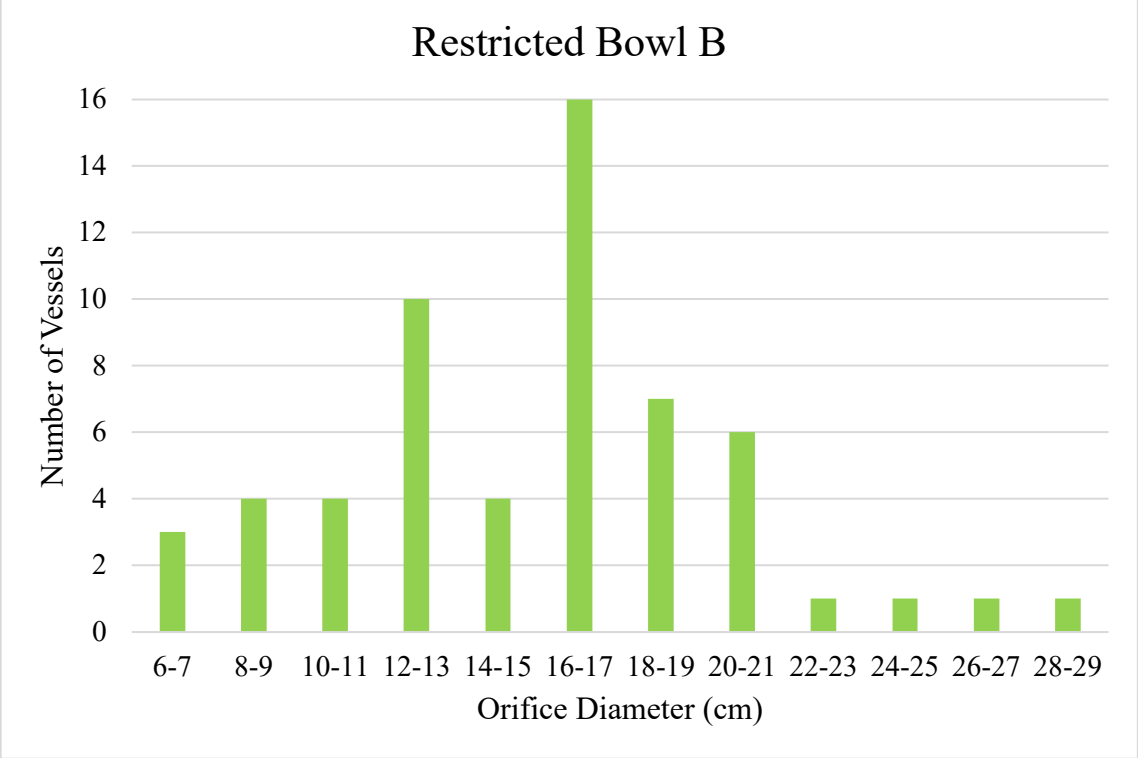

Figure 5.

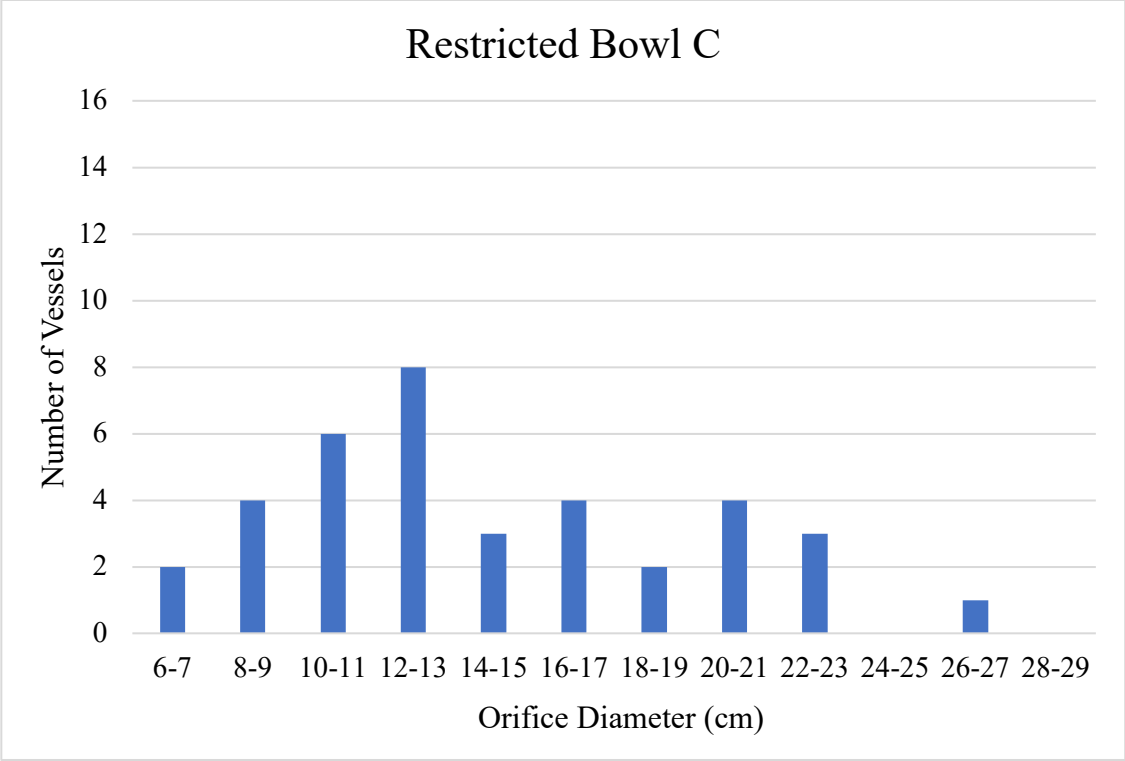

Figure 6.

diameter was 16 to 17 cm. Restricted bowl C falls within the middle of A and B as it had the second largest orifice diameter range. Its most common orifice diameter was 12 to 13 cm, making it the smallest orifice diameter. As a disclaimer, the frequencies of the vessel forms and their range of rim diameters could simply be due to the sample size.

Collared bowls came next with thirty-four vessels. The overall orifice diameter ranges from 8 to 23 cm. This analysis identified two different size classes: 14 to 15 cm and 16 to 19 cm, but the most common orifice diameter was 14 to 15 cm (table 2 and figure 8).

The third most common vessel form category was the jars and pots with 28 vessels. Orifice diameters range from 9 to 34 cm and there appear to be three size classes: small from 9 to 14 cm, medium from 17 to 24 cm, and large from 25 to 30 cm (Table 3 and figure 9). However, the jars and pots do have a standard size of 17 to 20 cm.

		Rim Diameter		
	Number of vessels	Most common orifice diameter	Size groupings	Overall range
Restricted Bowl A	38	14 to 15 cm	14 to 15 cm	7 to 22 cm
Restricted Bowl B	58	16 to 17 cm	12 to 13 cm and 16 to 21 cm	6 to 28 cm
Restricted Bowl C	37	12 to 13 cm	12 to 13 cm	6 to 28 cm

Table 1. Restricted Bowls A, B, C comparison

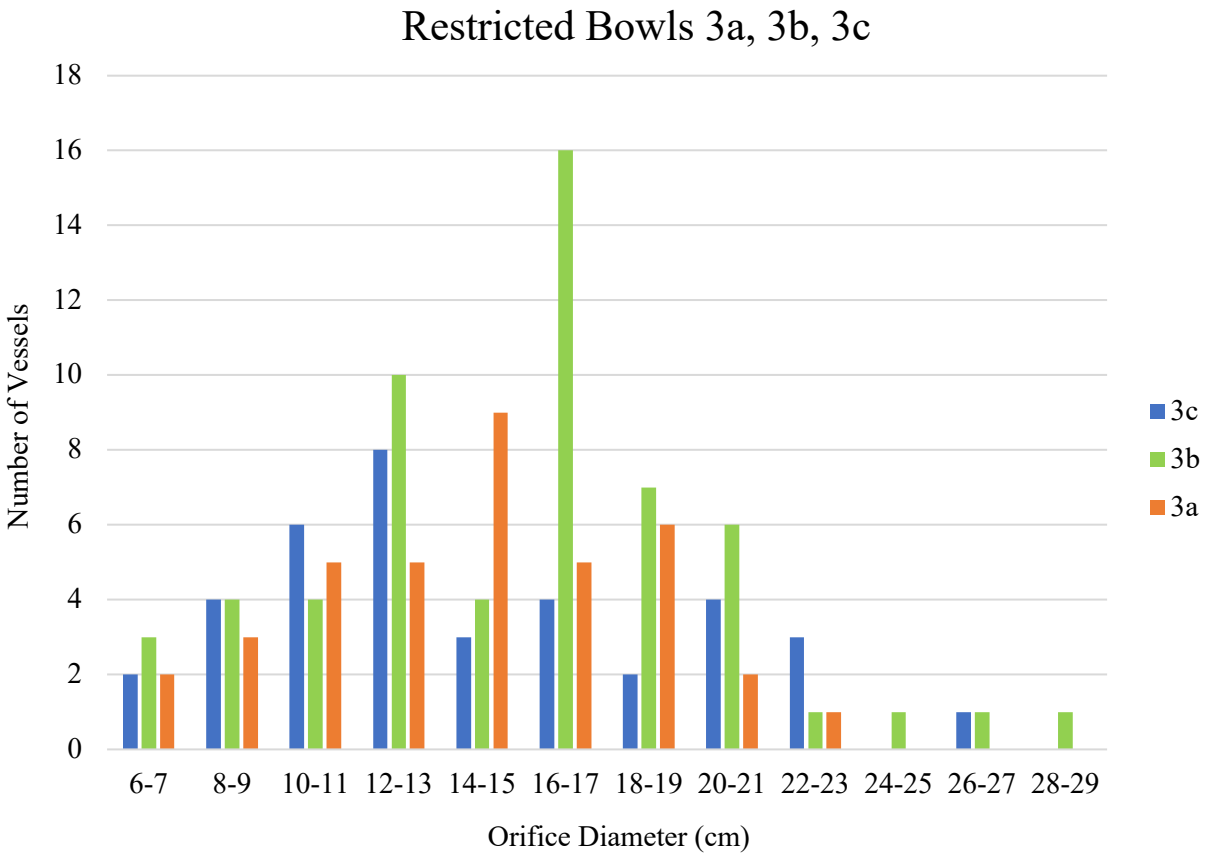

Figure 7. Restricted Bowls A, B, and C comparison.

		Rim Diameter		
	Number of Vessels	Most common orifice diameter	Size groupings	Overall range
Collared bowls	34	14 to 15 cm	14 to 15 cm; 16 to 19 cm	8 to 23 cm

Table 2

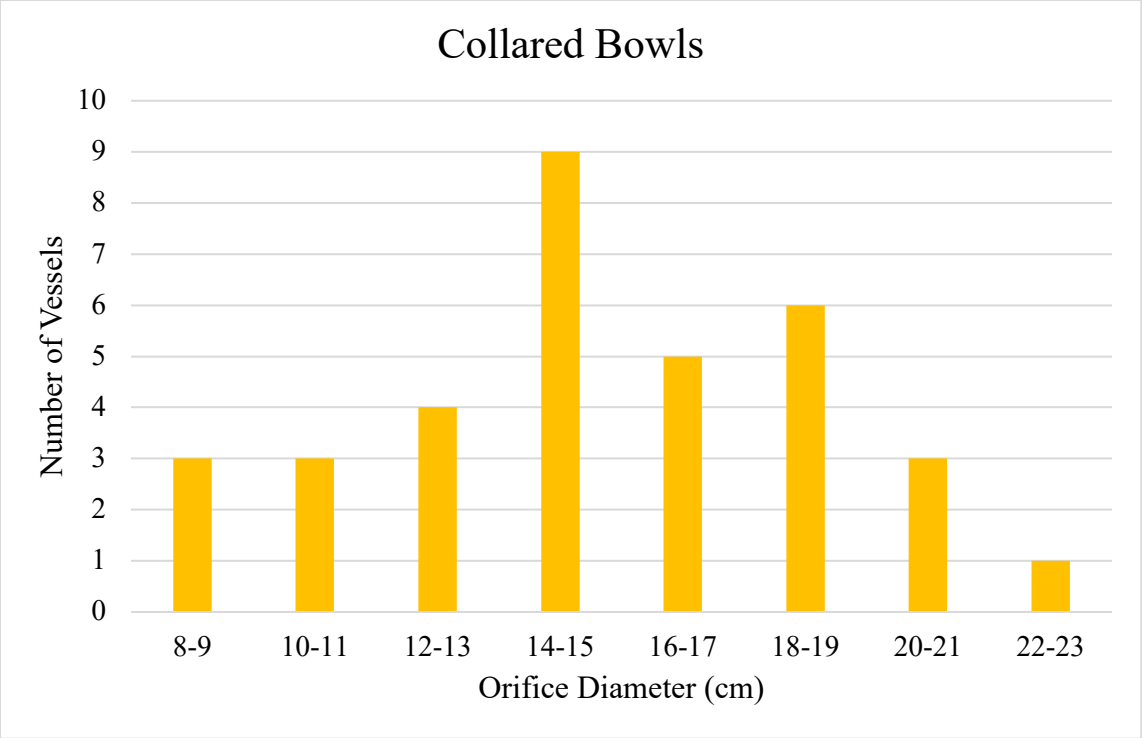

Figure 8.

		Rim Diameter		
	Number of Vessels	Most common orifice diameter	Size groupings	Overall range
Jars and Pots	28	17 to 20 cm	Small: 9 to 14 cm Medium: 17 to 24 cm Large: 25 to 30 cm	9 to 34 cm

Table 3.

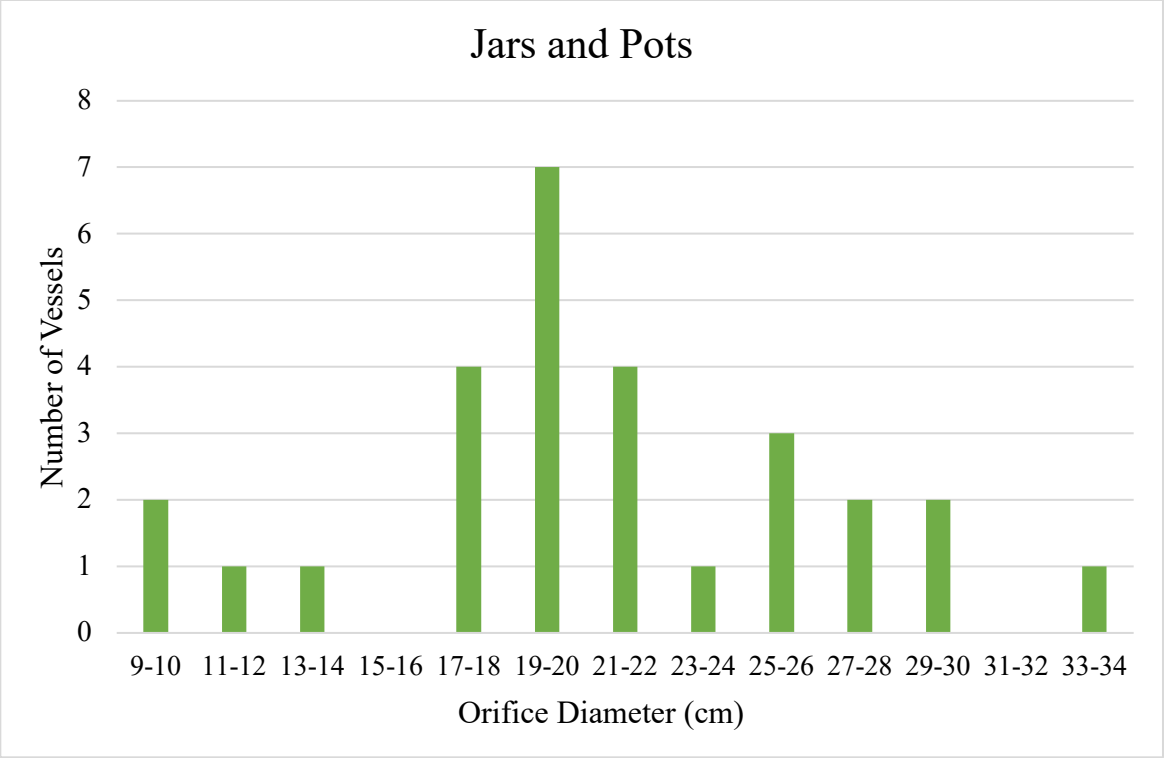

Figure 9.

Next were the unknown bowls category with 26 vessels, open bowls with 24, hemispherical bowls with 13, shallow bowls with lateral expansions with 2, beakers/bowls and plates with one. Beakers, jars/flared beakers, composite, shallow dishes/ bowls, and casuela vessel were not identified in this assemblage.

Temper comparison

This portion of the analysis compared vessel form, temper material (varies by vessel form), and temper size (very fine, fine, fine-medium, and coarse). For the sake of time, this portion of the analysis will only look at the vessel forms that occurred the most: restricted bowls A, B, and C, collared bowls, and jars and pots.

The most common vessel forms in this sample were restricted bowls A, B, and C, collared bowls, and jars/pots. Restricted bowl A (table 4) had a total of 62 sherds and had sand,

grog, and a grog/sand mixture as temper, with sand temper being the most common (n=55), grog with only four sherds and grog/sand mixture with three sherds. The most frequent temper size was fine-medium with 29 sherds, fine had 24 sherds, coarse had five sherds, and very fine four sherds. There was a total of 116 restricted bowl B (Table 5) with sand, grog, grog/sand mixture, clay/sand mixture tempers. The most common temper within restricted bowl B was sand (n=103), followed by grog (n=6), grog/sand (n=5), and clay/sand (n=1). Fine-medium (n=47) temper was also the most common for this vessel form, but fine temper was similar with 41 sherds. Restricted bowl C (n= 49) (Table 6) had sand, grog, and grog/sand mixture, with sand tempered sherds occurring most frequently (n= 42), followed by grog and grog/sand temper with four and three, respectively. Fine-medium temper was the most frequent with 19 sherds and fine temper had 14 sherds. Overall, within the restricted bowls category, the most common temper material used in Tates Hammock pottery was sand and the most common size of tempering materials was fine-medium.

Following the earlier pattern, collared bowls are the second most common vessel form in this sample (n= 58). Again, the most common tempering material for collared bowls was sand (n= 51) followed by grog (n= 1), grog/sand mixture (n= 5), and clay/ sand mixture (n= 1). Fine-medium sized temper (n= 25) was also the most frequent in this vessel form. Fine temper followed with 20 sherds, coarse temper had 13, and there were zero very fine temper sherds.

Restricted Bowl A	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	4	22	24	5	55
Grog	-	-	4	-	4
Grog/Sand	-	2	1	-	3
Total	4	24	29	5	**62**

Table 4.

Restricted Bowl B	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	9	39	41	14	103
Grog	-	-	4	2	6
Grog/Sand	1	2	1	1	5
Clay/Sand	-	-	1	-	1
Total	10	41	47	17	**116**

Table 5.

Restricted Bowl C	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	5	14	19	4	42
Grog	-	-	2	-	2
Grog/Sand	-	1	3	1	5
Total	5	15	24	5	**49**

Table 6.

Finally, jars and pots (table 8) had 34 sherds present in this sample and sand, clay, and a grog/sand mixture tempering were identified. The most common tempering material for this vessel form was sand with 28 sherds, followed by clay and grog/sand mixture with one and five, respectively. Fine- medium temper was identified in 22 sherds, fine temper in 3, coarse tempering in 9 sherds, and zero sherds had very fine temper.

Overall, the general pattern seems to be that sand tempering was the most common in these vessel forms and fine-medium temper was used the most. Fine temper was also used frequently in these pottery vessels, coarse temper was used less, and very fine temper was not used very often. In fact, when looking at the entire assemblage of 379 sherds, fine-medium temper was 45% of the sample and was followed by fine with 34%. Coarse temper was found in only 15% of the assemblage and very fine temper was present in 6%.

Collared Bowls	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	-	15	23	13	51
Grog	-	1	-	-	1
Grog/Sand	-	4	1	-	5
Clay/Sand	-	-	1	-	1
Total	-	20	25	13	**58**

Table 7.

Jar/ Pot	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	-	1	18	9	28
Clay	-	-	1	-	1
Grog/Sand	-	2	3	-	5
Total	-	3	22	9	**34**

Table 8.

Subassemblage and assemblage comparison

The final portion of this analysis compared the overall assemblage with the pottery sherds found in the large pit features, which is believed to be associated with mound activities, in three different ways. First, this study simply compared the frequency of vessel forms found in the subassemblage with those found outside of the subassemblage (table 9). Vessel forms that have at least ten more in the subassemblage than outside of the subassemblage are marked with an asterisk (*) to denote a significant variance, which are restricted bowl B, restricted bowl C, hemispherical bowl, unknown bowl, and collared bowl. In the subassemblage 80 pottery sherds were identified as restricted bowl B, and only 36 sherds were excavated from outside of the pit

Vessel Form	Subassemblage	Outside of Subassemblage	Overall
Beaker	1	-	1
Open Bowl	31	30	61
Restricted Bowl A	32	30	62
Restricted Bowl B	80*	36	116
Restricted Bowl C	39*	10	49
Hemispherical Bowl	18*	1	19
Unknown Bowl	18*	7	25
Composite	-	3	3
Beaker/ Bowl	1	1	2
Jar/ Pot	22	21	43
Dish/Bowl	-	-	4
Plate	2	2	4
Shallow Bowl with lateral expansions	3	-	3
Collared Bowl	46*	7	53

Table 9. Vessel form frequency subassemblage vs. Outside of subassemblage

features, differing by 44 sherds. Restricted bowl C had 39 sherds within the pit feature and 10 outside of it, which is a difference of 29 sherds. The hemispherical bowl form had 18 vessel sherds that were discovered within the pit features, and only one sherd identified from elsewhere at the Bayou St. John site. Finally, the collared bowls had a difference of 39 sherds, as 46 were excavated from the subassemblage and seven were not. The unknown bowl form is not immediately useful to this analysis due to the vessel form being unknown.

Secondly, this study compared vessel forms and orifice diameter from the most common vessels in the overall assemblage, which are described in detail above, and those found in the subassemblage. The most common vessels in the subassemblage were restricted bowls a, b, and c

with 27, 48, and 30 sherds, respectively. Open bowls and jars and pots were close behind with 20 sherds each.

Restricted bowl A's orifice diameter ranged from 7 to 22 cm, with two size classes: 10 to 11 cm and 14 to 19 cm, with the most common sizes being 10 to 11 cm and 14 to 15 cm. Restricted bowl B also had two size classes: 12 to 13 cm and 16 to 21 cm. The most common orifice diameter was 16 to 17 cm and ranged from 6 to 22 cm. Restricted bowl C's orifice diameter ranged from 6 to 26 cm, with 12 to 13 cm as the most common orifice diameter and one main size class: 10 to 13 cm. Overall (table 10 and figure 10), they all had similar diameter ranges, but restricted bowl A tended to be slightly smaller than B and C. Restricted Bowl C also had a wider orifice diameter range than A and B.

Subassemblage		**Rim Diameter**		
	Number of vessels	Most common orifice diameter	Size groupings	Overall range
Restricted Bowl A	27	10 to 11 cm and 14 to 15 cm	10 to 11 cm and 14 to 19 cm	7 to 22 cm
Restricted Bowl B	48	16 to 17 cm	12 to 13 cm and 16 to 21 cm	6 to 22 cm
Restricted Bowl C	30	12 to 13 cm	10 to 13 cm	6 to 26 cm

Table 10.

In comparison to the overall assemblage and as shown in table 1 and table 10, there are less restricted bowls in the subassemblage, but it is not a dramatic difference as they were the most common vessel form found in both the assemblage and subassemblage. The most common orifice diameters were exactly the same, except for restricted bowl A, as it had a smaller

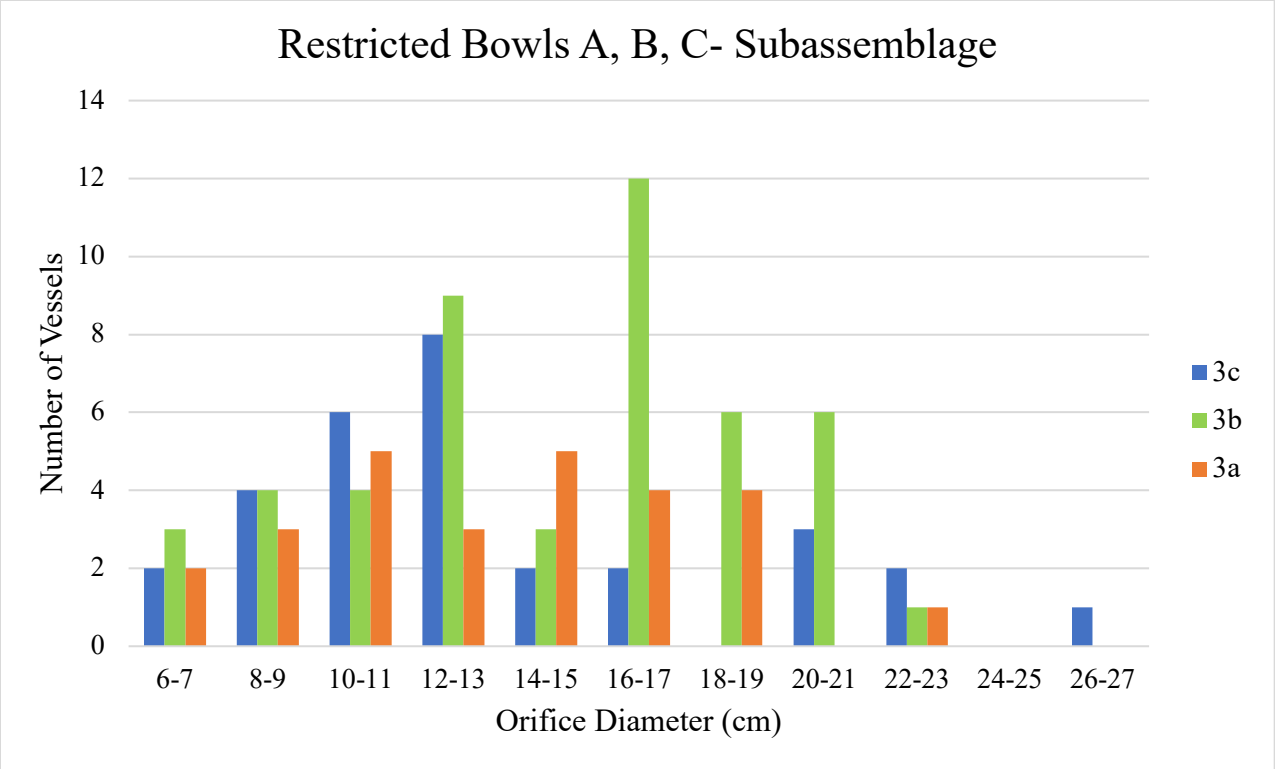

Figure 10.

common diameter. Restricted bowl A only had one size group in the overall assemblage, while it had two size groups in the subassemblage and one is smaller, and the other is wider. The rest of the size groupings were identical to each other. The overall ranges were also fairly similar, but restricted bowl B and C were slightly smaller in the subassemblage.

Open bowls (table 11 and figure 11) from the subassemblage ranged from 9 to 24 cm and the most common orifice diameters were 9 to 10 cm and 19 to 20 cm. There appeared to be two size classes: 9 to 12 cm and 19 to 20 cm. This vessel form was not able to be compared to the overall assemblage, because it was not one of the most frequent vessel forms. The fact that it is heavily represented in the subassemblage and not the overall assemblage, could provide insight into the food related activities at Bayou St. John during the Tates Hammock phase.

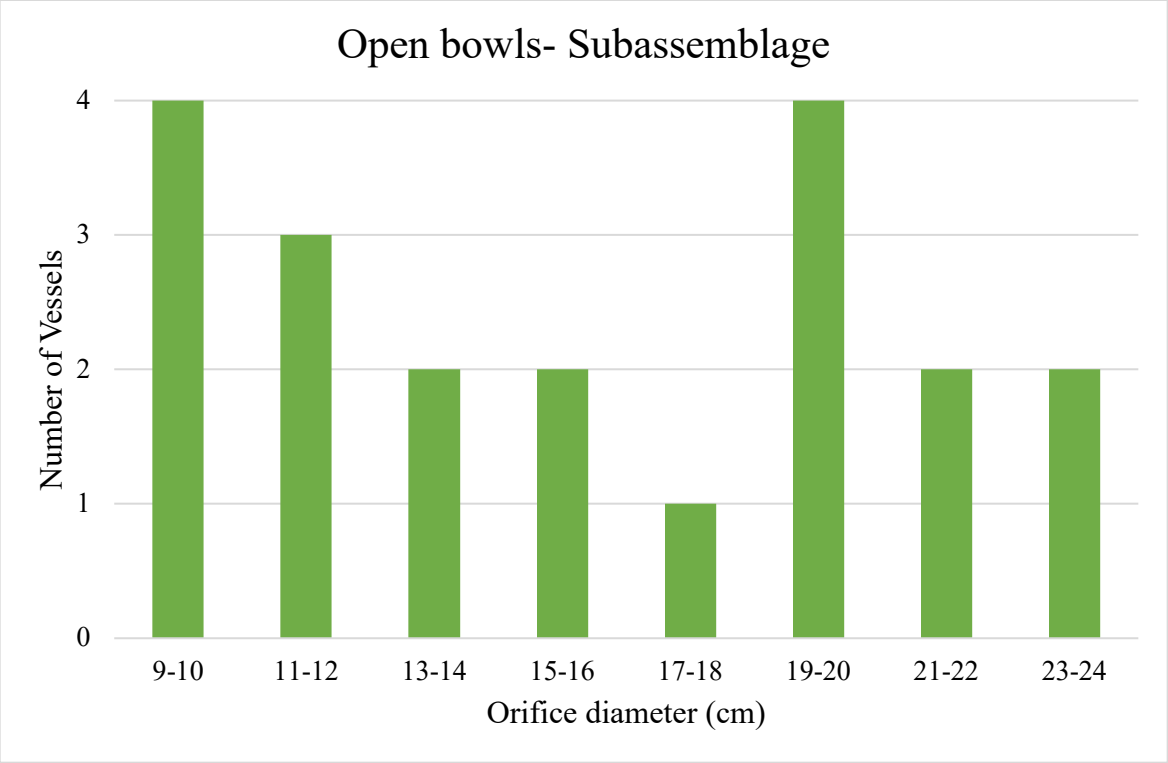

Figure 11.

Subassemblage		**Rim Diameter**		
	Number of Vessels	Most common orifice diameter	Size groupings	Overall range
Open bowls	20	9 to 10 cm and 19 to 20 cm	9 to 12 cm; 19 to 20 cm	9 to 24 cm

Table 11.

The sample of jars and pots in the subassemblage ranged from 9 to 30 cm, had a common orifice diameter of 21 to 22 cm and one size group from 17 to 22 cm (table 12 and figure 12). In comparison to the jars and pots in the overall assemblage, those in the subassemblage had a slightly larger common orifice diameter by 2 cm. In the overall assemblage, there were three size groups, but in the pit features there is only one, which falls in the medium group. The overall range for the subassemblage sample was smaller by 4 cm.

Subassemblage		Rim Diameter		
	Number of Vessels	Most common orifice diameter	Size groupings	Overall range
Jars and Pots	20	21 to 22 cm	17 to 22 cm	9 to 30 cm

Table 12.

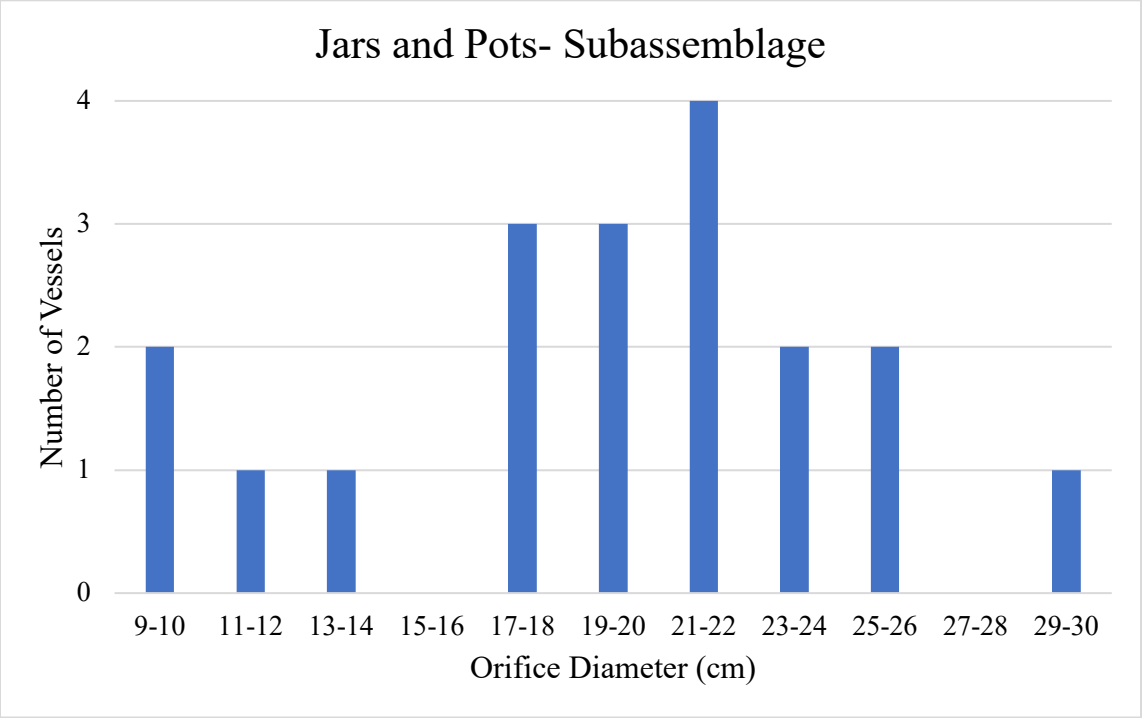

Figure 12.

Finally, this study compared the temper material and size within the subassemblage to the overall assemblage. The results of temper material and size of the overall assemblage can be found above. For this part of the analysis, vessel forms were chosen because they were the most common forms identified in the subassemblage. They include restricted bowls A, B, and C (n=151), collared bowls (n=46), open bowls (n=31), and jars and pots (n=24). Open bowls were not previously a common form, which could possibly give insight into the different activities taking place near the mound.

Restricted Bowls A, B, C	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	13	54	50	17	134
Grog	-	-	6	1	7
Grog/Sand	1	3	3	3	10
Total	14	57	59	21	**151**

Table 13.

Collared bowls	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	1	11	20	9	41
Grog	-	1	-	-	1
Grog/Sand	-	3	-	-	3
Clay/Sand	-	-	1	-	1
Total	1	15	21	9	**46**

Table 14.

Open Bowl	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	3	7	13	4	27
Grog	-	1	2	-	3
Grog/Sand	-	1	-	-	1
Total	3	9	15	4	**31**

Table 15.

Jars and Pots	Temper Size				
Temper	**Very Fine**	**Fine**	**Fine-Medium**	**Coarse**	Total
Sand	-	1	11	8	20
Grog/Sand	-	2	2	-	4
Total	-	3	13	8	**24**

Table 16.

As table 13 shows, the most common temper material for restricted bowls was sand (n=134) and the most common temper sizes were fine-medium (n=59) and fine (n=57). In comparison with the overall assemblage, they are similar in that sand is the most common material, but they slightly differ because fine temper is used almost as frequency as fine-medium temper. Again, the collared bowl sample (table 14) is primarily tempered with sand (n=41) and used primarily fine- medium sized temper (n=21). This pattern is very similar to that found in the assemblage. The open bowl form (table 15) also follows the same pattern with a large majority of vessels using sand (n=27) and fine-medium temper (n=15). Jars and pots (table 16) again follow the same pattern of primarily sand (n=20) and fine-medium sized temper (n=13). Overall, the temper used in the subassemblage follows almost the exact same pattern of sand and fine-medium tempering, except within the restricted bowls, which had almost the same amount of fine temper as fine-medium.

Conclusions

Vessel form and orifice diameter

The different proportions within the restricted bowl category could indicate that they served different functions. Based on Braun (1980) and data collected in this analysis it is likely that restricted bowls could have had versatile functions. Restricted bowls A, B, and C had a high CS value, implying that they were not serving vessels. By this inference, restricted bowls were likely storage or cooking vessels due to their high CS value. Kassabaum (2015) also agreed that restricted bowls were not serving vessels but likely for cooking or storage. Restricted bowls were the most common vessel form within the vessel assemblage, which could be an indicator of the primary food related activities taking place at Bayou St. John during the Tates Hammock phase.

Collared bowls have a high CS value due to its restricted neck, therefore it is also implied that they were intended to function as cooking or storage vessels. Jars and pots within this collection are characteristic of cooking vessels due to their high FA quality with wide orifices and high CS quality because of slightly restricted orifices (Braun 1980; Kassabaum 2015). With jars and pots being the second highest vessel form in the assemblage, this also indicates that cooking was a common vessel function at Bayou St. John.

Vessel forms, such as, open bowls, hemispherical bowls, shallow bowls with lateral expansions, beaker/bowls, and plates, were identified the least and all had a low CS value and high FA value, which could indicate that these were likely intended to be serving vessels. The large number of likely cooking or storage vessels and the small number of serving vessels could indicate that they were eating directly from the cooking or storage vessel or that distribution of food via a serving vessel was not a common activity, maybe reserved for special occasions. Willey (1949) stated that the majority of Weeden Island pottery vessels were small collared jars and flattened globular bowls. This analysis has found this true within the Bayou St. John assemblage as restricted bowls/ flattened globular bowls were the most common vessel form identified, and collared jars were the second most common. It is difficult to determine what Willey meant by "small," but in relation to the overall range, vessels tended to be in the middle or smaller half of the range. However, this study does disagree with Willey's previous findings, because the majority of vessels recovered from this assemblage were likely cooking or storage vessels. Willey (1949) found that the vessels were primarily intended for eating, drinking, ceremonies, and storage, rather than cooking. While he identified storage as a popular function, it seems that cooking was also a popular activity at Bayou St. John.

Temper comparison

Overall, there was a very clear pattern present within this assemblage, as sand temper and fine-medium sized temper were identified in vessels the most. Willey (1949) and Fuller (1998) found that Weeden Island and Tates Hammock pottery used sand tempering more frequently than any other temper. This analysis has found that to also be true at Bayou St. John.

According to previous research (Braun 1983; Steponaitis 1984) fine tempered vessels would have been most resistant to mechanical stress and initial cracking when exposed to thermal stress, but it would not have had a long use life if exposed to thermal stress often. Coarse tempered vessels would have been the best suited for cooking as they could withstand thermal stress and have a longer use life (Steponaitis 1984: 108). This could suggest that if they were using the majority of vessels for cooking purposes, the vessels would have had a short use life and had to be replaced often. This could alternatively suggest that the majority of these vessels were not intended for repeated exposure to thermal stress. There could have been a small percentage (15%) that were used best for cooking activities and the majority (45% and 34%) were intended for storage, possibly serving. Previous research from Weeden Island and Tates Hammock sites do not seem to have conducted an analysis, such as this one, to determine any patterns with vessel tempering.

Subassemblage and assemblage comparison

The first portion of this comparison found that there were some vessel forms, restricted bowl B and C, hemispherical bowl, and collared bowl, that were found more frequently within the subassemblage than outside of the subassemblage. Restricted bowls B and C were previously found to likely be storage or cooking vessels. Hemispherical bowls, however were not a common

vessel form in the overall assemblage, which could indicate that this form was used more frequently near the mound. This vessel form has the qualities of a serving vessel, as it has a high FA and a low CS value, indicating that serving was likely a common food related activity around the mound. Collared bowls were also previously identified as likely storage or cooking vessels. Overall, this indicates that storage, cooking, and serving activities were taking place near the mound at Bayou St. John.

A comparison of the vessel form and orifice diameter between the assemblage and subassemblage revealed that the two were fairly similar but had some differences. Restricted bowls in the subassemblage differed from the overall assemblage, in that A had a smaller common orifice diameter and there were two size classes in the subassemblage rather than one in the assemblage. The overall ranges of B and C were slightly smaller in the subassemblage. Interestingly, open bowls became one of the most common vessel forms found in the subassemblage. It cannot be compared to the overall assemblage, because it was not a common vessel form. However, there does appear to be two different size classes, small and large. Jars and pots were also a common vessel within the subassemblage and the overall range was smaller than the assemblage. Also, instead of three size classes, there was only one and the common orifice diameter was slightly larger than that found in the overall assemblage. This data suggests that cooking and storage were also occurring around the mound, but they differed in size slightly, which suggests that there could have been different intended purposes for vessels around the mound than outside of it. This also suggests that open bowls were used primarily around the mound and the two size classes could have been intended for different purposes.

The final portion of this comparison analyzed the differences in temper between the overall assemblage and the subassemblage. It found that tempering in the subassemblage had a

similar pattern to that found in the assemblage. The temper was predominately sand and fine-medium sized temper, but fine temper was almost as common as fine-medium within the restricted bowls. This could suggest that vessels forms in the subassemblage either had a short use life if exposed to thermal stress often, or they were not intended to be heated frequently.

Discussion

Based on all of the information gathered by this study, the majority of pottery vessels at Bayou St. John were formed primarily as cooking and storage vessels but tempered in a way that would not be ideal for frequent cooking. This could suggest that the majority were intended to be storage vessels. It could alternatively suggest that vessels used for cooking were replaced often due to their short use life. In the overall assemblage, there was a small frequency of vessel forms that were formed to likely function as serving vessels, which could indicate that within the overall activities at Bayou St. John, serving was not one of the most frequent food related activities.

Within the pit features subassemblage there does appear to be some patterns that dissent from the overall assemblage and some that follow. For example, open bowls are much more common within the subassemblage than outside of it. This suggests that serving was occurring near the mound more than other areas at Bayou St. John. Restricted bowls B, C, and collared bowls also are more common in the subassemblage, which could indicate that these vessel forms were intended for a specific cooking or storage purpose.

Within the context of the Weeden Island culture, Bayou St. John seems to adhere to patterns found in previous research, except for the large numbers of possible storage or cooking vessels. The site also appears to coincide with known Tate's Hammock data, though there

appears to be a minimal amount of research done on the phase (Fuller 1998). This analysis has provided data on vessel form frequency, orifice diameter, temper material and size of the overall assemblage and patterns of vessel form, orifice diameter, and temper material and size within the subassemblage possibly connected to mound activities.

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