A STRATIFIED SITE SAMPLING RESEARCH PLAN FOR THE 2005-2006 INVESTIGATIONS AND RECOVERY AT NORTH CAROLINA ARCHAEOLOGICAL SHIPWRECK SITE 31CR314

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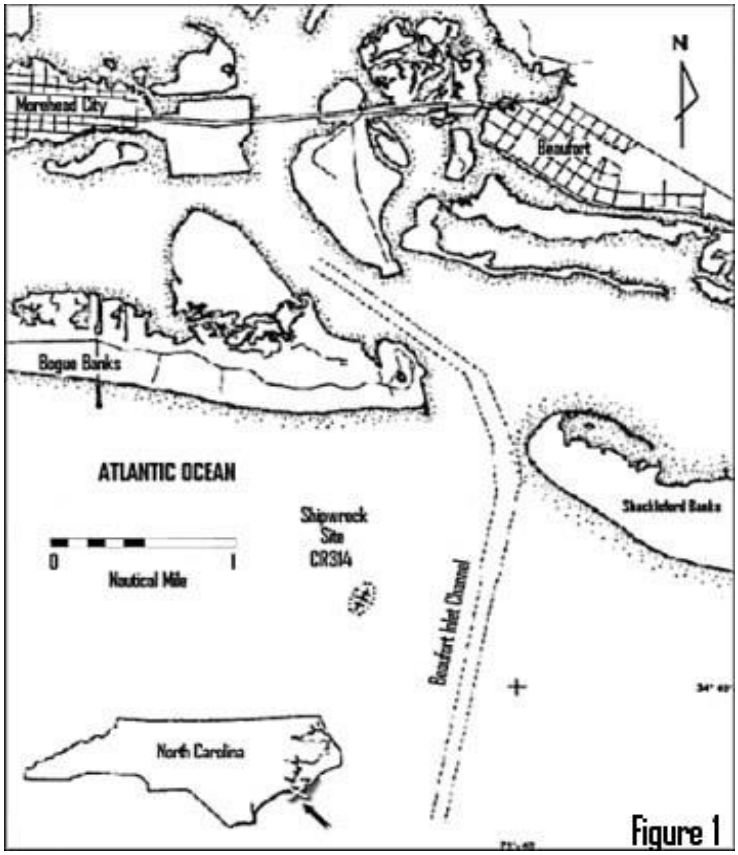
Introduction

North Carolina shipwreck site 31CR314 has been under investigation since its discovery in 1996 and continues to reveal a rich assemblage of early 18th century maritime cultural materials. The analysis of datable artifacts that have been collected from the site provides a mean date of manufacture of 1706 with predominately French and English affiliation (Wilde-Ramsing 2006). Ship's features reveal a vessel of 200 to 300 tons (Moore 2001; 2006). Armament represented on the site is equivalent to that of a Royal Navy Sixth Rate warship, while the presence of langrel shot in one of the small caliber guns suggests a predator or heavily armed merchantman rather than a Royal Navy warship (Henry 2006).

Historical research of maritime activities occurring along the coast of colonial Carolina and specifically in the waters near the fledgling town of Beaufort reveals that the presence and loss of a vessel of this size and nature would be quite unusual throughout the 18th century (Butler 2006). According to two reliable contemporary historical accounts, however, such an event occurred in 1718 when a vessel named *Queen Anne's Revenge* (QAR) grounded on the outer bar of the inlet (Brand 1718; Bonnet 1719:45). When the present location of shipwreck 31CR314 (Figure 1) is projected onto the historic the Wimble Chart, 1738, it appears on the outer margin of the outer shoal where the grounding of *QAR* is likely to have taken place. Although no definitive piece of evidence has been retrieved during the initial examination of the shipwreck, these multiple lines of inquiry provide evidence linking the shipwreck lying on the outer margin of Beaufort Inlet with *Queen Anne's Revenge* and the internationally recognized personage Blackbeard, who captained the ill-fated vessel. With less than 15% of the site physically examined and much less fully excavated, recovered, and analyzed, there is still much to learn through archaeological investigations.



Concurrently, geophysical examination of site 31CR314 indicates that it lies in an unstable environmental situation that threatens its long-term preservation (Wells and McNinch 2001, McNinch et al 2001, Trembanis and McNinch 2003; Gibbons 2004; McNinch et al 2006). Steady sand depletion, exceeding one foot (0.30 m) every decade since the 1930's, is linked to channel stabilization that began at that time (Suggs 2004). Today, because the site lies on scour-resistant firm sand, it is either exposed or buried under a thin layer of protective sand. This increases the threat of disturbance from catastrophic scour and erosion caused by tropical storm events, a frequent occurrence since observations began in 1996. Subsequently, state archaeologists developed a management plan (Wilde-Ramsing and Lusardi 1999), which was endorsed in 2005 by a professional review panel, to mitigate potential loss at the site by conducting full recovery as soon as adequate funding could be procured (Wilde-Ramsing 2006). The findings and analysis obtained during the exploratory and emergency recovery phases of archaeological investigations (1996-2004), including artifact analysis and conservation, have provided the basis to develop a research strategy for site mitigation, from field recovery through exhibit and final storage. An important factor that was emphasized in the 1999 management plan and now permits site investigations to move forward is the development of a permanent, professionally staffed, state archaeological conservation facility in partnership with East Carolina University and a commitment from the North Carolina Maritime Museum to provide long-term artifact curation and collection oversight.

The scope of the plan presented here derives from these findings and recommendations and presents a stratified site-sampling program as a preliminary step toward full recovery. This work is designed within the constraints of available funding and provides important supplemental information to facilitate planning and implementation of a larger recovery project at site 31CR314. Funding is being provided by a grant from the Golden LEAF Foundation and two one-time annual state appropriations to support a six-week field session and a follow period for artifact cataloguing, preliminary analysis, and storage. As a precursor to the full recovery phase, a stratified sampling regimen has been developed based on current understanding of the site layout. Stratification consists of seven lateral zones from south to north representing the projected orientation of the ship from stern to bow. Sampling will involve the excavation of up to 20 excavation units - three within each of the five interior zones with additional units placed at the longitudinal extremities.

This sampling design will meet managerial objectives of retrieving a representative sample across the shipwreck as a control collection prior to any further degradation of the site from storm scour and exposure. By examining and recovering remains from all parts of the archaeological site, managers will refine their understanding of the extent, nature, and magnitude of site remains in preparation for planning full-scale recovery. Directed sampling and analysis will also address general research questions regarding site layout, identify shipboard activity areas, continue refining the nature, origin and identity of the lost ship, and gather data regarding natural and cultural factors that have influenced the formation of the archaeological record. The collection of representative sample remains from this shipwreck and the arrangement of artifacts within basic functional groups will provide a body of evidence for comparison with archaeological assemblages recovered from contemporary shipwrecks along the Atlantic seaboard, the Caribbean and Europe and terrestrial sites within the Carolina's and Virginia. This preliminary analysis and identification of artifacts, especially those encased in concretions, will

be facilitated by the use of X-radiography. This work will be conducted at the North Carolina Museum of Art and funded through a National Geographic Expeditions Council grant.

What are not within the scope of this sample recovery plan are the subsequent cleaning, analysis, conservation and long-term storage and display of recovered artifacts. Based on previous work on *QAR* artifacts, at the current funding levels for conservation ($100,000 annually), conservation will take at least 5 years to process, analyze, and transfer to museum care the artifacts and data anticipated from the 2005-2006 stratified sampling project (Watkins-Kenney and Nordgren 2005). Additional funding for conservation would significantly reduce the length of processing time, although larger artifacts, specifically cannon, would require additional time to complete conservation. As work commences both in the field and the conservation laboratory, estimates for full recovery can be better refined and adjusted.

The sampling plan presented here is an updated version of an earlier plan (Wilde-Ramsing 2005) developed prior to May 2005 when the stratified sampling program began. During that fieldwork only half of the sample units were excavated and a follow-up expedition in the fall was canceled due to hurricane activities and travel restriction (Wilde-Ramsing and Southerly 2005). Completion of site sampling is now scheduled for May 2006 and in anticipation, this recovery plan is a revised and further developed version based on last year's experience and additional literary research. The author has developed this plan, in consultation with project members, and as a requirement for a directed studies under Dr. Charles R. Ewen, as partial fulfillment for the doctoral requirements of the Coastal Resource Management Program, East Carolina University. Supplementing the recovery plan are operations plans written by field supervisor Chris Southerly (2005) and project conservator Sarah Watkins-Kenney (2005).

Goals, objectives and theoretical basis

Management and Mitigation

From the beginning, basic cultural resource management (CRM) survey and standard information gathering procedures and techniques have been employed at this shipwreck site (Wilde-Ramsing and Lawrence 1984; Neuman and Sanford 2001). Initial data collection resulted in the designation of the shipwreck site by North Carolina Department of Cultural Resources' Secretary Betty Ray McCain to be a state protected area "of primary scientific, archeological, or historical value." On the national level, the site 31CR314 was determined to be eligible for inclusion on the National Register of Historic Places by the State Historic Preservation Officer and officially listed in March 2004. A management plan (Wilde-Ramsing and Lusardi 1999) was produced to guide resource development and preservation with recommendations to strive toward full recovery based on the shipwreck's significance and threats to its preservation from natural impacts. During a review of project findings held on the campus of East Carolina University in April 2005, a panel of professional marine archaeologists reiterated this managerial position with a greater sense of urgency noting effects from past hurricanes and the potential for more damage from impending storms, in the foreseeable future (Wilde-Ramsing 2006).

Undertaking full recovery has not been possible until recently, however, because of the lack of adequate project facilities and data management systems. As these were being developed (1999-

2004) the time has been spent gathering additional archaeological, historical, and geological information, developing and testing educational outreach initiatives, and strengthening partnerships necessary for the long-term management and study of this extremely important submerged cultural resource. With the lack of a permanent conservation facility and adequate staff throughout the exploratory phase, excavation and artifact retrieval was minimized and researchers opted for strategies that included site exposure, mapping and reburial of remains in the same manner as terrestrial archaeologists strip off the plow zone. The use of remote sensing, particularly the gradiometer, provided an understanding of the site's layout. While considerable information was derived from these low-impact methods, it has fallen short in some ways, primarily by not providing sufficient physical evidence both in terms of quantity and spatial variation to determine artifact type and frequency as they relate to site layout and activity areas. A stratified sampling regime in which up to 10 % of the shipwreck site is considered the most appropriate way to address basic limitations in the present data set while working within the confines of available funding. In addition to fieldwork, additional time and funding has been allocated to permit cataloguing and preliminary examination of recovered artifacts prior to placing them in a wet, stable laboratory environment for long-term storage.

Proposed sampling will meet two management objectives. The first goal is to recover a representative cross-section of the shipwreck site for future analysis and study. This collection will be particularly important should a catastrophic storm event impact the site and should such an event occur would provide baseline data to observe changes that occur to the archaeological record due to current-driven artifact movement and resorting. The collection will also allow management a more reliable base of information upon which to plan full mitigation. Having a representative sample of up to 10% of the shipwreck site will help refine current estimates based on limited excavation and exploration and provide a more accurate means to estimate future time, costs, personnel and facilities needed to complete more extensive mitigative procedures. Information learned here will further identify and prioritize research questions and determine methods of recovery that will collect relevant data and expedite the process in a cost-effective manner.

Research and Analysis

Beyond managerial utility, gathering of a stratified sample provides data that can address basic research questions. The fact is little comparative archaeological data is available related to 31CR314, an armed merchantman plying the Atlantic seaboard of colonial America. The most extensively reported is the *Whydah* lost in 1717 (Hamilton *et al* 1992), which may indeed prove invaluable to the study of QAR remains, and the equally well-reported *Betsy*, a British transport scuttled in the York River in 1783 (Broadwater *et al* 1996). At the same time, sites from the proprietary period of colonial Carolina (1663-1729) have seen little archaeological activity. The primary comparative collections are from two sites, Eden House and the Joseph Scott House located in the upper Albemarle region of the state (Lautsenheizer *et al* 1998; Bandy 2000). The point being that collecting reliable archaeological data of a site-specific nature to help interpret and describe activities involving this shipwreck would, in itself, be the basis for investigations at this site. Intra site analysis will continue to test hypotheses regarding the site's identity and mission, crew behavior, circumstances of loss, and subsequent natural site formation processes. Marine geologists have interpreted a sequence of natural environmental impacts that have

contributed to the site's location and condition today. Additional archaeological testing can be directed in such a way to further test their interpretations.

Site Identity and Comparative Collection

When archaeological sites are poorly understood or have been inadequately sampled, the recovery of additional data, representative of activities across the site, will advance basic knowledge of human activities at that location. One of historic archaeology's strengths lies in the ability of its practitioners to play archaeological evidence off of evidence found in documentary sources. This is further enhanced when it is possible to tie a shipwreck to "a ship's history, which results in great value by linking people and events to archaeological materials" (O'Shea 2004:1533). Additional recovery from 31CR314 will continue to test the working hypothesis that these remains represent the *Queen Anne's Revenge* by searching for a trend in evidence that would refute this claim. This would most readily come from artifacts clearly post-dating the sinking date of 1718.
As more and more evidence is recovered and analyzed, this body of descriptive evidence will provide a solid basis upon which to compare activities represented at this site to others allowing researchers to investigate broader "…questions of man at sea, societies extending themselves, human beings under stress, and the ship system of interrelated artifacts comprising a microcosm of human interaction" (Lenihan 1983: 63). When this data is organized in a consistent way, archaeologists can move beyond intra-ship studies that "represent a paradigm of description and historical integration" and begin to take on inter-site studies where broader trends can be seen (Cockrell 1983: 213). Some sites relative to 31CR314 can include those contributing to Cockrell's inter-site studies for vessels originating from the same parent country, operating during the same time period, or engaged in similar activities. Comparisons with *Whydah* (Hamilton *et al* 1992) are the most obvious here. The discovery and study of *Adventure*, a second vessel in Blackbeard's fleet lost during the same event as *QAR*, would provide invaluable comparative data at the inter-fleet level to fine-tune behavioral studies. Additional comparative data can derive from terrestrial sites linked in time and geography to 31CR314. This intra-ship/related terrestrial culture may be viewed in the remains at sites such as Eden House (Lautsenheizer 1998) and Joseph Scott plantation (Bandy 2000) located in the Albemarle region of the Carolina colony during the proprietary period. As Cockrell explains,

"It is hoped that making these conceptual devices explicit will assist in clarifying complex sets of data, in order that they may be more creatively manipulated. Additionally, given the ship as a temporarily closed community, both spatially and temporally, the ship (or fleet) possesses vast potential as a control for examining the terrestrial parent culture. In isolation one may address various cultural systems and study their adherence to, or variance with, the open terrestrial cultures with which the ship community interacts prior to and after its closed status." (Cockrell 1983: 217)

Intrasite Analysis - Site Layout

Based on observations to date, cultural remains at 31CR314 retain spatial integrity upon which to delineate and observe historic shipboard activities. Intra-site studies of individual shipwrecks are common in underwater archaeology and have demonstrated that a close analysis of seabed distributions can detect distinct ship features and activity areas and consequently provide a

means to examine cultural expressions tied to the floating vessel (Muckleroy 1978; Adams 2001; and many others in between and since). In order to explore the research potential of shipwreck artifact patterning, certain assumptions must be made according to Larry Murphy:

1. "Regularities of shipboard life occur and will be reflected in the archaeological record.
2. Specialized activities will produce artifact patterns relative to those activities.
3. Shipboard activity may overlap in certain areas.
4. The data will be skewed relative to discard patterns. Discard patterns may be widely varied - trash dumped overboard, cleaning and reballasting, etc.
5. The record may not be complete because whole portions of activity loci (i.e. vessel structure) may be completely absent from the record. The nature of loss makes a big difference what might be present on the site. A combination of historical and environment analysis needed to more accurately interpret archaeological record.
6. Data from comparative sites have been collected." (Murphy 1983:79-80)

The last assumption continues to be a problem for underwater archaeologists, since very few comprehensive collections from shipwrecks are available for comparative purposes and many those are often compromised due to inadequate collection and/or conservation methods. HMS *Dartmouth* (1690) as discussed in *Maritime Archaeology* (Muckelroy 1978:188) is particularly relevant for interpretation of the *QAR* site. In the case of the *Dartmouth*, indicator artifacts such as instruments, tableware and pistols were tied to stern activities while items related to the boson were in the bow. Similarly at 31CR314, instruments and tableware are concentrated at the southern end and thus suspected to be the stern. Archaeological evidence also suggested that the *Dartmouth* lay over on its starboard side and in the process its cannons fell from the deck and were distributed along the northern edge of the site. Analysis of artifact classes from the *Dartmouth* supported horizontal distribution of lower to upper hull layout resulting from its laying over on its side. Bricks, tiles, and faunal remains related to the galley area (upper deck level) were separated by a sterile band from lead shot (armory) and rope and rigging elements (boson's locker) originally located in the lower part of the hull. At 31CR314, cannon are distributed along its western margin suggesting that, in this case, the ship heeled to port and spilled objects from its deck. The distribution of additional lower to upper hull related artifacts has yet to be examined and specific activity areas, such as the galley area, have not been identified.

Site Formation Analysis

The absence and distribution of artifacts at 31CR314 will provide evidence of natural site formation processes. Analysis of the site (Southerly 2006) has placed this shipwreck into Class 2/Class 3 using Keith Muckelroy's (1978) classification system for wreck sites. Characteristics include the survival of fragmented elements of structural members, some organic remains, and the presence of many other artifacts. Spatial distribution of the artifact assemblage is scattered but ordered. Southerly continues his assessment of the 31CR314 by placing it within the Buoyant Hull Fracture Category developed by James Delgado (1997: 57-59). While the system is typically used for beach wrecks, it also fits well with shipwrecks resting in an inlet's ebb-tidal delta. The events creating this category of archaeological shipwreck site are described in the following fashion. An intact or nearly intact vessel runs aground and then breaks up, during

which structural components and artifacts scatter to varying degrees before sanding up and becoming buried. Subsequently, portions of the site may become re-exposed during periods of sediment erosion and during exposure items may further deteriorate and be broken up into smaller components. Artifacts will be re-distributed during exposure and eventually the site may be entirely lost (Delgado 1997: 57-59).

The above scenario may very well describe events at 31CR314 based on multi-disciplinary observations (McNinch *et al* 2001 and 2006; Trembanis *et al* 2003; Wells and McNinch 2001; Suggs 2004; Lindquist 1998). Given its historic location, the doomed vessel was immediately subjected to both offshore and inlet currents, and therefore its lower portions likely buried quickly while the upper works weakened and broke off, depositing the heavier, more resilient artifacts onto the seabed, which too buried. Dispersion of the upper works would have been dependent on the force of surface winds and subsequent seabed currents, inlet flow, and the nature and weight of cultural materials. Historic charts indicate several episodes when the inlet migrated across the shipwreck site during the 19th century and early 20th century (Wells and McNinch 2001). During times when inlet currents flowed directly over the site, the wreckage became re-exposed and the site likely suffered further deterioration. The last inlet migration event took place in 1927 when channel depths were 20 feet at the site. Judging from this episode, historic exposure to inlet currents may have been relatively short in duration, measured in terms of months rather than years. In 1928, water depths were 15' and by 1930, the site was completely shoaled with only 6' of water over the site (Suggs 2004).

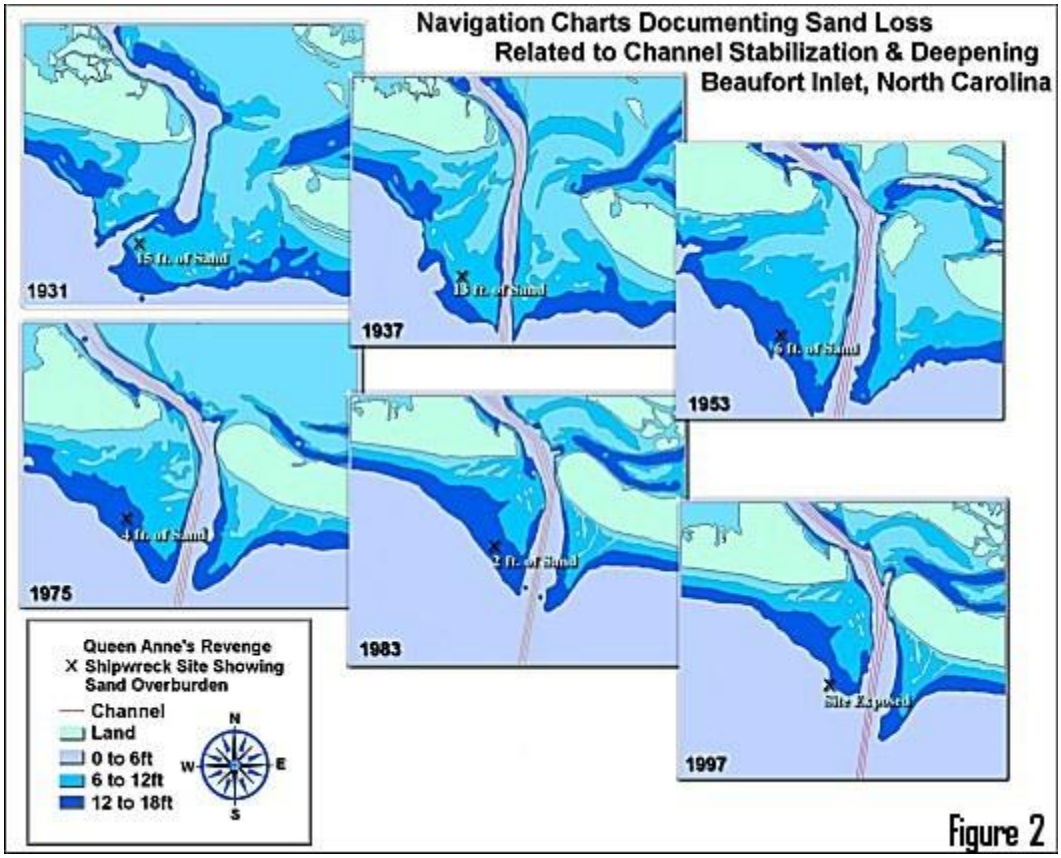
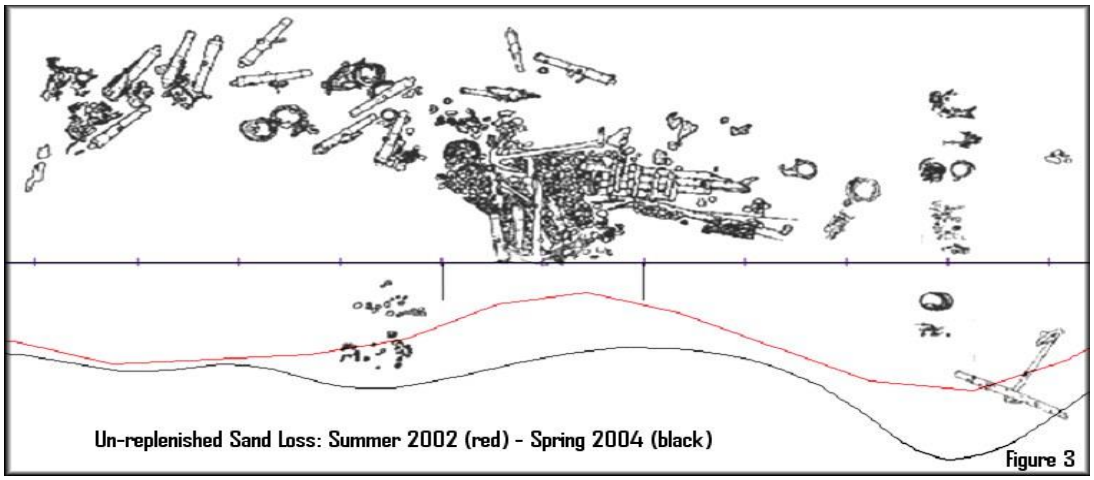


Figure 2

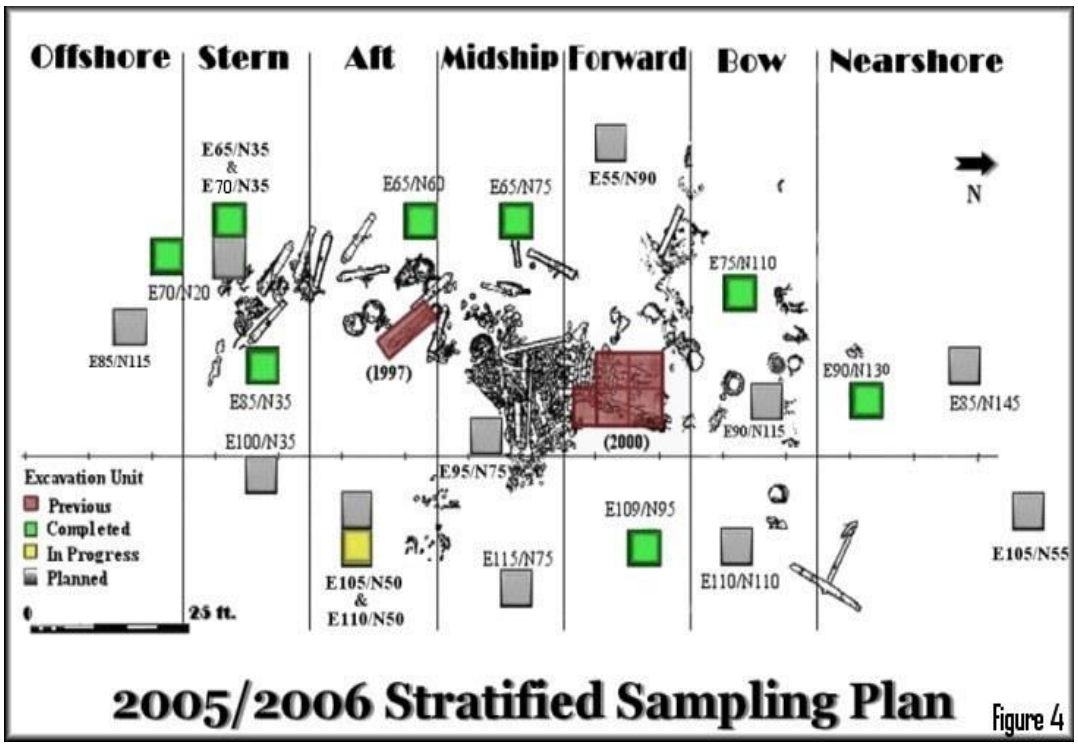
Since the 1930s, charts show a shift from the occasional impacts of natural migration to the long-term effects of inlet stabilization and progressive deepening and widening of the shipping channel by the US Army Corps of Engineers beginning in 1936. Nautical charts over the past 70 years show the slow and steady loss of sediment at 31CR314 (Suggs 2004) (Figure 2). This is symptomatic of an the overall erosion of the ebb-tidal delta due to channel dredging, which has taken large amounts of sand out of the littoral system (Cleary 1999). Nautical charts and age dating of the most mature coral growing on the exposed wreckage at the *QAR* site (Lindquist 1998) indicate that around 1980 water depths reached 20 feet and the site became exposed. Over the past 25 years, wave-generated, bottom currents, predominantly hurricanes, have continuously affected the archaeological remains. The primary reason for this exposure is a scour resistant sand layer, which lies beneath the wreck site and restricts the burial process (McNinch et al 2001). Recent studies by project archaeologists show a five-inch net sediment loss relative to exposed portions of the site over the past four years, thus demonstrating an increasingly exposed condition (Southerly 2006) (Figure 3).



Methods

Stratified Sampling Strategy

Based on past investigations of 31CR314 a directed sampling strategy is proposed as the most cost effective and timely way to gather comprehensive data. Although it is not entirely random, the sampling regime allows more or less total site coverage and will provide a body of evidence for comparison of areas within the site and with other archaeological sites and historical documentation, as well. For this purpose, up to twenty 5 x 5 foot (1.524 x 1.524 meters) excavation units will be placed across the site to bring the area fully excavated to approximately 10% (Figure 4). The 1997 excavation unit around cannon C2 and the five units associated with the emergency recovery of the hull structure in 2000 are integrated into this sampling plan. The logic behind unit placement is based on current understanding of site extent and ship orientation. Seven lateral zones (nearshore, bow, forward, midship, aft, stern, and offshore) have been used to dissect the site based on researchers' knowledge of site layout and extent. The interior zones are each 25 feet (7.62 meters) wide while the end zones are left open to include artifact scatter either north (nearshore) or south (offshore) of the main concentration.



Site layout is based on the projected length of an early 18th century vessel of 90 - 100 feet (27.43 - 30.48 meters) overall length as reflected in the archaeological record (Figure 5). The orientation of vessel remains is based on the observed distribution of functional classes of artifacts across the site as they relate to a traditional ship's layout. Projections for the location of the stern at the south end of the site are indicated by a greater predominance of pewter plates, scientific and medical instruments, gold dust found in that area, a greater and richer assemblage. Conversely, a large anchor on the north end is thought to be one the ship's bower anchors.

Unit location within each zone has been selected to address research inquiries beyond simply stern to bow site stratification. Above providing an adequate sampling within each zone, unit placement is oriented east to west to potentially reveal the circumstances of the wrecking event and site deposition. Specifically this would reveal whether the vessel settled and deteriorated on even keel or instead heeled over on its beam-ends distributing its remains in a discernable pattern. Evidence that this ship may have fallen over on its port side during the wrecking process is suggested by the scatter of cannon along the west side. (Figure 6). A similar occurrence has been reported for the HMS *Dartmouth* where it also appears that the horizontal stratification between the lower bilge and deck level was observable (Muckelroy 1978:188). This artifact distribution should be discernable from a vessel that deteriorated on level keel, where artifacts lying east to west would represent starboard to port and exhibit few discernable differences.

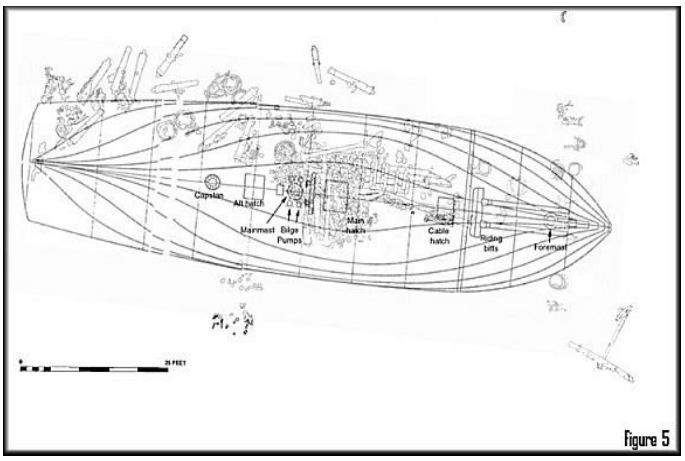


Figure 5

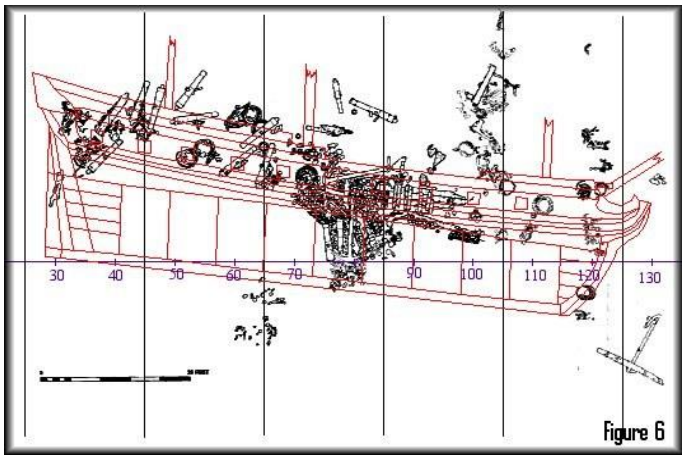


Figure 6

The placement of systematic units across the site also allows archaeologists to examine potential impacts from natural elements. Based on previous observations, dominant current flow during periods of exposure is in a northerly or shoreward direction (McNinch *et al* 2001). Marine geologists using sub-bottom sonar have revealed the presence of scour marks from other submerged shipwrecks, which act as obstructions to alter current flow and enhance scour and deposition (Caston 1979; Quin *et al* 1997). This phenomena is also reported at 31CR314. "The concretions of the artifacts create a strong backscatter signal [sub-bottom sonar], inverted and expressed as white, and can be seen elevated above the surrounding seafloor with a linear depression visible in the background immediately behind the mound" (McNinch *et al* (2006:17). Based on predominant current flow, artifacts with less specific gravity are more likely to be propelled to the northern portion of the site and overall artifact distribution should extend further from the main wreckage. Preliminary observations, examining ballast recovered from 31CR314 has shown a proportionally greater number of smaller, lighter stones forward of the midship area as opposed to the aft section (Craig 2005 pers. com.). Artifact distribution observed during exploratory excavations hints that at the southern margins of the site, definition is much greater than the northern end where artifacts appear to thin out, presumably due to scour.

To gain a better understanding concerning localized movement of small artifacts horizontally across the site, excavation units may be expanded on either side of at least one large object, such as a cannon prior to its recovery. The purpose is to determine if there is a detectable snowdrift effect whereby heavier artifacts concentrate or pile up on the side from which the predominant

current flows (south) compared with the lee side (north) where small artifacts may be less abundant due to obstruction from the larger object and subsequent scour and dispersal.

Within the sampling scheme, several units will also be placed predicated their potential to reveal specific details about the site or recover known concentrations of related artifacts. Some excavation units are designed to investigate gradiometer targets that are likely to represent undocumented cannon. Ship's cannon have proved among the most chronologically diagnostic type of artifact, providing dates of manufacture based on style and in one case an absolute casting date. They also provide a better understanding of overall ship size and armament, as well as gunnery practices distinguishing military from non-military practices. Perhaps most importantly, individual cannon often bring with them a wealth of attached, well-preserved artifacts as part of the overall concretion. Cannon C4 with over 700 intact, hand-wrought nails and the large, ballast covered concretion, which contained cannons C19 and C21 and many other items such as tobacco pipes and animal bone, both amply illustrate the reason for seeking out cannons as items to recover. Other artifacts, particularly pewterware and scientific instruments, may contain marks related to manufacture or ownership and will be recovered as the occasion arises.

The recording of elevations in the past has revealed that the site is highly deflated beyond the concentration of remains at the center of the site, which represents the main ballast pile complete with numerous cannon and several anchors. Using string and line levels, a temporary datum will be established on each of the baseline stakes, which will in turn provide a means to establish vertical reference points at each of the excavation units (southwest corner post). When distances of less than 30 feet (9.14 meter) are maintained when pulling vertical references coupled with multiple measurements, 3-inch (0.07 meter) accuracy will be maintained throughout the site. Because of deflation, recording stratigraphic measurements in most units will provide minimally significant data and therefore, will not be a priority unless field observations reveal otherwise. One exception will be the unit placed adjacent to the exposed mound where culturally deposited remains may hold vertical importance.

Some attention will be paid to the fine sand zone upon which all cultural materials at the site are known to rest in an attempt to better understand the extent and depth of this scour resistant and culturally sterile sediment layer. Several excavation units will be selected for deeper excavation to penetrate this underlying layer of sand to determine its thickness and to take sediment samples. This information will provide geologists with further data upon which to base predictive modeling for storm impact studies.

Individual Excavations Unit

The placement of excavation units are done so to adequately sample the site as discussed above. They are listed by zone from south to north and within those zones from west to east. The southwest corner designates all units. The order of excavation, which is discussed below, will not take place in this order (see Figure 4).

Offshore Zone

E70/N20 and E85/N15 - Examine extent and occurrence of artifacts south
(seaward of the projected stern)

Stern Zone

E65/N35 - Examine extent of artifacts west/projected upper deck level.
E85/N35 - Check negative anomaly area and investigate rudder and stern post/bilge section.
E100/N35 - Examine extent of artifacts east/projected lower hull area.

Aft Zone
E65/N60 - Examine extent of artifacts east/projected upper deck section and check small anomaly target. E110/N50 - Check small anomaly target and lower deck level.

Midship Zone
E65/N75 - Examine extent of artifacts west/ projected upper deck level; recover cannon C15 if possible. E95/N70 - Investigate mound stratigraphy, potential sealed deposits for sampling (i.e. pollen); recover cannon C5 if possible.
E110/N75 - Examine lower deck section.

Forward Zone
E55/N90 - Examine extent of artifacts west/ projected upper deck level.
E109/N95 - Check small anomaly target and lower deck section.

Bow Zone
E75/N110 - Collect artifacts at projected upper deck level and check large anomaly target as potential cannon.
E90/N115 - Investigate portion of previously excavated area (1998 120'trench) to observe movement of artifacts from previous site drawing or noticeable differences between excavated and unexcavated area in terms of artifact quantity or preservation.
E110/N110 - Examine extent of artifacts east/ projected bilge area.

Nearshore

E90/N130, E85/N145, E105/N155 - Examine extent and occurrence of artifacts north shoreward of the projected bow.

Recovery Methods

After establishing unit location, installing a corner stake, orienting a mapping frame over the unit, excavation will proceed. Dredge operators will be experienced archaeologists and archaeological technicians, coordinated by the supervising archaeologists. Recovery will proceed as follows:

- Removal of overburden down to the tops of the artifacts, which may be negligible to nearly 4 feet (1.22 meters), will be accomplished with a 6" induction dredge and the unscreened outfall will be directed toward the margins of the site and noted on the site

plan. The dredge operator will be directed to stop operations and report the situation in the event that cultural materials are detected.

- Once the artifact layer is encountered, the 6" dredge will continue until the tops of artifacts are defined. During this stage, excavation will be extended on each side to attain side slopes that minimize slumping of sand during the completion of the excavation.

- The artifact-bearing layer is known to be less than 0.75 to 1.12 feet (0.23 to 0.38 meter) based on past observations. Once the tops of artifacts are defined, physical mapping, recording the elevations of major artifacts and sediment levels, and if possible, photo-documentation will be undertaken.

- Excavation will then commence with a 3" dredge system to clean around and highlight artifacts for mapping. Once artifacts within a unit are sufficiently exposed, each unit will be drawn and when possible photographed noting artifacts larger than 0.5 feet (.15 meter) and/or those with diagnostic attributes, as well as notable clusters of small artifacts or other features.

- Archaeologists will record basic elevations from positions taken from the datum post using a string and line level. Heights will be recorded for the seabed height, elevations of prominent artifacts, and bottom of the cultural layer (top or scour resistant layer).

- Mapped artifacts or groups of artifacts will be tagged and/or bagged, and recovered as a single feature. Tagging will be done in a manner that will provide an object's original orientation to allow post recovery photographs to digitally integrate the artifacts onto the unit plan using an Autocad mapping program. Smaller artifacts that did not warrant mapping will be recovered as a feature, given a single provenience, and brought to the surface for inspection, cataloguing, and processing.

- After removing all discernable artifacts and prior to reaching the lowest level of the cultural layer, a 'scoop' sample will be taken from the lower level of the cultural layer and processed using the gold panning method to recover the smallest of items, such as small flakes of gold or minute lead shot. Since artifact resorting has been observed throughout the site based on the presence of intrusive modern materials, tiny lead shot and flakes of gold are likely to be the only significant cultural materials surviving in context due to their relative weight and migration to the lowest portion of the cultural layer during site formation. This 'scoop' sample, which consists of a volume of approximately 2 gallons (7.57 liters), will provide approximately an eighth to a tenth of the basal portion of each unit's cultural layer. This amount captures an adequate sample within each excavation unit for intra-site comparison without requiring the time and equipment needed to recover all materials from the unit. While this has been accomplished in the past using a gold sluice system located on the recovery vessel, its use requires time, equipment, and labor that was better used completing all units in the allotted time. When full-scale recovery commences and if the plan is to recover and process all sediments, it will be more efficient to revisit and complete the recovery of that time.

- At several units, as time and conditions allow and at the discretion of the archaeological supervisor, excavations will continue below the cultural layer to sample and document the nature and depth of the scour resistant layer and underlying strata. Excavators will employ sediment sampling and stratigraphic profiling to explore the extent of this layer.

- Detailed operations plans have been developed to provide procedure and protocol during all phases of data and artifact recovery planned for the 2005-2006 expeditions. See the attached Field Operations Plan (Southerly 2005) and Conservation Recovery Plan (Watkins-Kenney 2005).

Artifact Processing and Analysis

Project archaeologists will use a modified artifact cataloguing system originally developed by Stanley South for pattern analysis as a means to discern culturally significant trends on British Colonial settlements in the Carolinas (1977). Identifiable artifacts from 31CR314 will be classified using basic categories of ship architecture, armament, sustenance, personal effects, tools, cargo, and intrusive (post early 18th century). Careful inspection with the trained eye is the first step in this process. Cataloguing artifacts from a marine environment, however, can be a challenge because often concretion obscures an artifacts identity. With the exception of ballast stones and the few artifacts that are free of concretion and observable, such as those made of lead, most artifacts will not be readily available for analysis due to heavy fouling from corrosion and marine growth. With the recovery of three to four hundred concretions, each containing multiple and varied artifacts, providing a meaningful cataloguing of artifacts for preliminary analysis will be no small task.

To aid this process all recovered concretions are to be taken to the North Carolina Museum of Art where they will be X-rayed with funding from a National Geographic Expeditions Council grant. X-radiography on previously recovered concretions has enabled researchers to identify lead shot, glass beads, nails and other iron fittings, items of pewter and copper alloy, gold flakes, and in one instance, a wooden ruler was detected within a bar shot concretion (Welsh 2005). While X-rays cannot reveal everything contained in a concretion, especially organic materials, nor provide a means to accurately measure individual items, they greatly advance our understanding of the artifact assemblage given the investment in time and cost compared with manual cleaning and conservation. Beyond their potential in terms of analysis, X-radiography helps determine priorities for further investigation of artifacts and during that process will provide the conservator with valuable clues on how best to clean and break apart concretions mechanically.

Regardless of what they represent, detailed, standardized information for each artifact will be recorded in the conservation database including location on site, material type, weight, and size. When possible these artifacts will be placed within function groups and all information then entered into the project's specimen database along with provenience and material type. Classifying artifacts within each excavation unit sets the stage for an examination of their frequency and relationship between units and across the site. Determining chi square distributions and testing significance using the t-test can establish the relationship of artifact types and their frequency between units and areas of the site. Meaningful distributions can

address questions concerning the ship's layout, circumstances of loss, and site formation processes as the initial steps in inferring discrete behavior.

The simplest spatial observation will focus on the quantity and distribution of redundant artifacts like ballast that provide the location of the lower bilge area extending out in either direction from the mainmast. Based on current knowledge of the site's orientation and layout, artifacts related to officer duties will be found on the south or stern end of the debris field, as ship's were traditionally laid out. The degree to which these are segregated from similar artifacts in the bow can reflect the degree to which the crew maintained a strict hierarchical system of management. Based on descriptions of 18th century slave ships, which apparently was *QAR*'s former service, nearly all crew activity, both officer and sailor, would have been restricted to the stern to minimize contact with the human cargo and the possibility of slaves gaining control of the vessel (Gaston-Martin 1993: 28-33; Boudriot 1984: 18-19). On the other hand, the perceived egalitarian nature of pirate society might have homogenized artifact distribution spreading artifacts, such as navigational instruments and finer wares, forward into the cargo area of a slaver or the enlisted quarters of traditional merchantmen and military ships (Rediker 1987: 254-287).

An understanding of the affect currents have played in forming what is seen today can also be examined and tested through intra-site distributions. Acknowledging environment is important to avoid attributing increased frequencies of items to cultural behavior. For instance, with the predominant current flow from south to north, it may very well be that artifacts with lighter density once located in the stern area have been propelled toward to the bow. To determine how influential natural impacts have been in the past, a study of the size and distribution of ballast stone size will provide insight. It is reasonable to assume that smaller, lighter rocks would have migrated with seabed currents during times of exposure at a greater rate than heavier ones and that these will be reflected in greater densities within various units. If ballast sizes were relatively uniform within the bilge while afloat, then any meaningful distribution with regard to size and weight will allow researchers to quantify impacts to the entire archaeological record caused by the environment. Ballast distributions can be compared to concretion distribution in a like manner to see if the same phenomena are present. These are a few basic examples of how a stratified sampling regime and distribution analysis can further understanding of the cultural and environmental processes represented at 31CR314.

Expected Outcome and Evaluation

The completion of fieldwork is expected at the end of May 2006. At the time of excavation and field analysis, units selected to examine anomaly targets and potential activity areas will generally be answered. For instance, the recovery of what has been preliminarily identified as the ship's toilet (pissoir) in May 2005 represents the extreme end of the vessel, since it is a heavy lead object that is likely not to have moved far from its original position. Conversely, if this heavy item is not in its original position then environmental forces played a greater role in forming the archaeological site that currently thought to be the case. Other areas, such as evidence of bricks and tiles from the galley stove, may come to light in the field.
Artifact x-raying and cataloguing has taken place during the winter and spring of 2005-2006 and will continue through the summer 2006. Cataloguing and spatial analysis will follow. The use of chi-square calculations in combination with computer software utility programs, AutoCAD and

ESRI ArcGIS 9.0, will allow archaeologists to better understand the relative position and association of artifacts across the shipwreck. Comparative analysis of certain types or classes of artifacts and their quantities within respective unit zones and sections will test general expectations concerning vessel orientation, layout, affiliation, period, and lead to a more refined understanding of its meaning and archaeological potential. A comprehensive artifact assemblage will also provide the means to compare this site with other ships, specifically *Whydah* and *Betsy*, and collections from mid-Atlantic terrestrial sites as a means of gainer a broader understanding of its place in the economic, social and political events of the time. As more comparative data comes to light, the more it will be possible to identify similarities and differences as a means of eliciting underlying factors that guide human behavior.

The preliminary results of the 2005-2006 stratified sampling study will be presented during a symposium at the Society of Historic Archaeology conference held in January 2007 in Williamsburg, Virginia. The findings will be used to develop a full recovery research plan for 31CR314 and the basis to project equipment, personnel, and funding needs to undertake this level of archaeological investigation. The final outcome of recovery work undertaken during this phase of investigation will be dependent on the completion of concretion cleaning and analysis, which will take several years given the best scenario. At that time, a progress report will be produced as an addendum to the interim project report scheduled for completion later this year. While not covered within the recovery plan, a primary goal of the 2005/06 investigation satisfies goals of the Golden LEAF Foundation by heightening public awareness during renewed recovery operations. This, in turn, will lead to an increase in traveler visitation and spending in coastal North Carolina. This economic boost may clearly demonstrate the public's interest in the project and willingness to support the cleaning and conservation of artifacts recovered during 2005. If funding is successfully obtained for artifact processing, research and interpretive data will be greatly expanded since many more artifacts will be available for display at the NC Maritime Museum and other venues around the state and country, and the conservation laboratory will reduce its backlog in preparation for additional recovery. Evidence of public support can be measured through attendance at museums, exhibits, and programs featuring the *QAR* site, website hits, media coverage, and public inquiries. Ultimately, the final measure of success will come when the financial means are secured to adequately manage and protect the shipwreck for years to come. Given current understanding of the site situation and predictions of heightened storm activities in the immediate future, the full-scale rescue of all items lying on the seabed to safety of conservation and curatorial facilities of the state of North Carolina is likely an important and necessary final goal for shipwreck site 31CR314.

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