We describe scientific diving during an initial study of prehistoric landscapes characterized by drowned trees and shell middens discovered by a remote sensing and diving reconnaissance in 2012. Subsequent work in the summer of 2013 has focused on better characterizing these sites and their archaeological research potential. Modern sea levels are only the present day stage of the last glacial cycle that ended 15,000 years ago with the retreat of the Laurentide Ice Sheet (LIS). The study sites are well below modern low tide cycles suggesting the presence of preserved stream or estuarine paleoenvironments for the Georgia coast before modern sea levels were reached in the Mid-Holocene. Their continual inundation since submergence has preserved many organic features such as trees and the shell deposits adjacent to those trees. The aim of this research was to go beyond the reconnaissance level of study and to recover additional scientific information to determine their relationship or lack thereof with prehistoric human groups who occupied the Georgia coastal plain before its modern submergence. We present remote sensing data as well as the analysis of materials recovered from the submerged landforms.

Introduction

More North American archaeologists are investigating tidal and submerged sites for evidence of later Quaternary or early Holocene settlement of southeastern U.S. coasts (Garrison, 1992; Faught, 2004; Thompson and Turck, 2009). These types of archaeological sites were subaerial during long stretches of the late Quaternary and early Holocene, having only recently been inundated by sea level rise after the end of Last Glacial Maximum (LGM) at 18 ka. Present-day, or near present-day, sea level was only reached by the 7th millennium BP (before present), leaving potential sites from earlier periods underwater and invisible to terrestrial surveys.

One particular facet of the Holocene that has puzzled archaeologists in the Southeast is minimal evidence for cultural materials on the coastline during the Middle Archaic Period. This period elsewhere dates to ca. 8000-5000 BP. In Georgia, archaeologists have noted the low number and density of Middle Archaic Period sites on the Coastal Plain for some time (Williams, 1994; Elliott and Sassaman, 1995;
Kowalewski, 1995; Williams, 2000; Williams et al., 2013). Within the present day coastal zone (which extends from the seaward shores of the barrier islands to about 30 km inland), only three Middle Archaic sites have been found (Turck, 2012). Offshore and inshore studies of submerged archaeological locales have found little or no definitive evidence for this period either (Faught, 2004).

Material remains left behind by Middle Archaic populations are also not currently very well characterized for the tidewater zone (Turck, 2012). Middens made up of marine and/or estuarine shell and dating to this time are not present in the Georgia coastal area, while pottery, the other main diagnostic artifact type for archaeological sites in coastal Georgia, had not yet been invented. The main evidence for sites from this time period, therefore, will be lithic material. Even more frustratingly there is a strong possibility that perishable materials such may have composed a large part of the Middle Archaic toolkit (Elliott and Sassaman, 1995). This would fit the pattern noted elsewhere in the Southeast, where there was a notably increased reliance on local raw materials at that time. Coupled with this factor, there is a dearth of lithic material on the coast of Georgia. It seems highly likely then that traces of Middle Archaic activity will be more difficult to locate than later cultural material remains.

Figure 1. Georgia coast showing the principal modern and ancient barrier island systems. The AIWW locations mentioned in this article are referenced to this figure. Detailed locations for the sites discussed herein cannot be given because of the danger of unauthorized personnel exploiting explicit geodetic information.
In this paper, we describe the initial phases of study of submerged locales, along sections of the Atlantic Intracoastal Waterway (AIWW; Fig. 1) using scuba and air helmet diving techniques, to attempt to locate prehistoric sites, particularly those dating to the Middle Archaic Period.

**Objectives and Rationale**

The primary objective of our study was the location and identification of submerged prehistoric archaeological/paleontological sites in estuarine/tidal waters that are difficult to explore because of low or no visibility and other detrimental environmental factors such as currents, tides and sedimentation.

The rationale for doing such a study resides in the fact that underwater environments such as these are under-investigated by archaeologists. Additionally, because of the height of the present-day sea level, many previously habitable paleolandslapes are now continuously submerged. With modern rates of sea-level rise, any potential prehistoric locales will only become more deeply submerged and even less accessible for study.

The potential for the discovery of previously unidentified archaeological/paleontological locations, seems to be significant enough to justify this exploratory research. As described in our introduction, one of the present-day lacunae in the archaeological knowledge of the Southeastern U.S. coast is that of the lack of Middle Archaic Period sites. In justifying our study we would invoke the well-known maxim, “an absence of evidence is not evidence for absence.” A large part of the reason for a lack of evidence for Middle Archaic Period archaeological sites may simply be the lack of systematic exploration by archaeologists who have skill sets and technology to investigate submerged environments where these sites may be found.

**Methods**

*Scientific Diving*

In 2012, co-author Faught, during a reconnaissance level archaeological study of areas along the Atlantic Intracoastal Waterway (AIWW), used air helmet diving techniques (Fig. 2). Subsequent diving work in the summer of 2013, by co-authors Cook Hale and Garrison used scuba diving techniques. Both diving methods were found to be efficient for the shallow, tidal-stream depths encountered in the study area.

Figure 2. Diver with Superlite 17 air helmet, AIWW location.
Diving reconnaissance followed up on the identification of suspected prehistoric features and landforms using side-scan sonar and subbottom profiler surveys. In low-to-no visibility conditions, which are typical for estuarine and tidal streams in Georgia, diving for initial reconnaissance was an unproductive method because it is very difficult, if not impossible, to identify submerged sites. However, diving used as a means to identify and characterize suspected submerged prehistoric locations that were previously located using remote-sensing methods is a very useful tool.

**Geophysical**

To provide locations for diving assessments to be used, we utilized shallow-water geophysical survey methods such as side-scan sonar, sub-bottom acoustic profiling and magnetometry. In the summer of 2012, working on parallel but separate research projects, co-authors Faught and Garrison investigated differing locales along the AIWW in Georgia. Faught’s research focused on locating potential submerged archaeological sites along extended reaches of the AIWW as part of a project for the U.S. Army Corps of Engineers (USCOE) and utilized a full suite of sonar, sub-bottom profiling and magnetometry. The research done by Garrison’s team was part of a graduate research study and utilized sonar and magnetometry (Fig. 3). Faught’s research utilized photogrammetric (Fig. 4) and reconnaissance data from a much earlier (1979) survey of the AIWW in a project conducted by Garrison and Tribble (1981).

![Figure 3. Side-scan sonar of Grove's Creek thalweg, Skidaway Island area.](http://archive.rubicon-foundation.org)

**Videography**

The R/V GEORGIA BULLDOG, used in the summer of 2013, had underwater video capabilities. This equipment was used to examine a suspected prehistoric site’s bottom conditions in low-to-zero visibility conditions. As has been observed in other “telepresence” studies, the camera is superior to the human eye in these low visibility conditions. This quality enabled us to discern bottom type and/or sediment type as well as biota (Fig. 5) before carrying out additional investigations in the estuarine/tidal streams of the AIWW.
Sediment Grabs and Shallow Cores

The collection of bottom and subbottom sediment samples was a primary objective of both diving and shallow sediment core/grab sampling. The latter techniques were deployed alone or in concert with diving collection activities. The core/grab samples were taken using easily deployed over-the-side apparatus (Fig. 6 a, b).
Results

Divers investigated numerous potential prehistoric targets during the study led by Faught (Panamerican Consultants, Inc., 2012). Some of these locales had been previously identified in the 1981 report (Garrison and Tribble, 1981) as noted above. Those locations were shared with Faught and several were subsequently investigated in the course of the 2012 research. The 2013 research revisited three of the potential sites identified and investigated in 2012. A fourth location was investigated in 2012 and was not studied in 2013 but future research is planned for that site. The three sites, jointly studied in 2012-2013, will be addressed in order.

1. C 41, Jekyll Creek
2. SB feature 7/20, Rockdedundy, South & Little Mud River
3. SB feature 49, Rockdedundy, South & Little Mud River
4. C282, St. Augustine Creek

The shorthand used, above, is “SB” for sub-bottom profiler contact; “SS” for side-scan sonar contact; and “C” for “contact”.

1. C 41, Jekyll Creek

This site was a high backscatter sonar contact and recommended for avoidance or additional study by the 2012 study. Diver investigation confirmed the deposit as made up of whole and fragments of oysters. The sample collected and studied showed all specimens were disarticulated, with evidence of oxidation (rust color) on many. The deposit was considered as a secondary dump, most probably from dredging operations. The oyster shells were large and there were equal numbers of left and right valves suggesting a natural deposit (i.e., not prehistoric).

The 2013 study returned to the C 41 site to carry out additional study. Sonar was carried out primarily to relocate the features described in the 2012 study. Once the location was satisfactorily identified videography and sediment sampling was carried out. Shown in figure 7 the sediment grab and one such grab's contents are displayed. Two transects were sampled roughly 30 m apart with 14 grabs taken. The transects provided adequate sampling of the bottom sediments from shallow to mid-channel depths in Jekyll Creek.
As illustrated in figure 7, all sediments recovered were washed through wire mesh screens to recover small inclusions such as shell, bone, lithic material, etc. No diving was conducted at the site in 2013. No archaeological materials were recovered in the sediment samples thereby confirming the deposits were of a "natural" origin as surmised by the 2012 study.

2. SB features 7 and 20, Rockdedundy, South and Little Mud River

The feature is labeled as 7/20 because it was mapped on one sub-bottom line file as SB Feature 7 and another as SB Feature 20. SB Feature 7/20 was recognized in 2012 as anomalous by its layered and mounded character in contrast to the surrounding returns. The layering is the result of bands of light and dark reflections in the sub-bottom record (Fig. 7). The top of the feature is at 5 feet (1.6 m) under the water, its base at 14 feet (4 m) and its overall length is 700 feet (200 m). Figure 8 shows numbers on three possible sets of couplets that make up the structure, each with three to five sets. Diver excavations showed that the couplets were intercalated oyster shell and gray clay-silt or silty clay layers. Oyster shell was dominant with few specimens of other species; there were also small fragments of reeds. All specimens were disarticulated.

SB Features 20/7 and nearby SB 49 described below are essentially the same kind of seismic reflector (the boundary between beds with different properties) but SB Feature 49 is somewhat deeper and, therefore, possibly older. The formation process is unknown but includes alternating beds of clay, shell, clay, and shell, situated on the edge of the channel which suggests a migrating channel bed facies scenario (Farrell et al., 1993). Additional sampling was done in 2013 to help answer these questions. Likewise, a study of the oyster shells was conducted to ascertain whether the deposit was caused by natural or anthropogenic processes.

Irv Quitmyer (Florida Museum of Natural History; pers. comm. 28 August 2012) commented that the normal distribution of valves in a natural setting should have a preponderance of left (cupped/bottom) valves. This is because the right (flat/top) valves are more susceptible to reworking and fractionation than the left (cupped) valves. The 2012 report suggested that it was possible that these numbers are the result of human intervention (e.g., collecting). The 2013 study results indicated an obvious preponderance of top to bottom valves in the assemblage. Those data are: top/ right valve, n = 43; bottom/left valve, n = 16. If Professor Quitmyer’s opinion is correct, then this result suggests: (1) the assemblage is not the result of natural processes and (2) there may have been selective sorting of valves by predators, human or otherwise.
3. SB feature 49, Rockdedundy, South and Little Mud River

SB Features 7/20 and 49 are essentially the same kind of seismic reflector, but SB Feature 49 is somewhat deeper and therefore possibly older. The formation process is unknown but includes alternating beds of clay, shell, clay, and shell, the same as seen at SB 7/20 (Fig. 9). The overall length, 775 feet (220 m) is quite similar as well. Furthermore, sedimentologically and geomorphically the two locations are similar.

The shell deposits at both show a similar distribution in shell types and the sorting of their valves. The 2012 study identified 81 “top” valves in relation to 14 “bottom” valves. Further study results, in 2013, based on a larger assemblage from SB 49 agree with the results of 2012, i.e., top valves, n = 73; bottom valves, n =11. As previously noted, these results suggest selective sorting of the shell assemblage. Based on the analyses of the shell assemblage alone, these results imply that the deposits are anthropogenic in nature and may represent prehistoric activities at both sites. Figure 10 illustrates an interesting contrast in the shell species diversity at SB 49 in comparison with those of C 41 and SB 7/20 assemblages which were predominantly oyster.
As seen in Figure 10, gastropod shells are the predominant component. One whelk (*Busycon*) and one clam (unidentified) are shown but the remainders are *Littorina littorea* (common periwinkle) and one Naticidae species (“moon snail”). Gastropods, marine and estuarine, in the oyster midden suggests human agency for their presence. Marsh periwinkle (*Littorina littorata*) would have been collected on *Spartina* grass stems throughout the year (Fierstien and Rollins, 1987) and whelks (*Busycon* sp.) were likely picked up while collecting bivalves, as they are commonly found feeding in *Tagelus* beds (Purchon, 1977).

4. C 282, St Augustine Creek

In Figure 11, Contact C 282 remains an area of potentially significant submerged cultural resources. In the sonar data this area included larger (> 1 foot (20 cm) diameter) and smaller (< 3 inch (7.25 cm)) protuberances that were confirmed as tree stumps and smaller “posts” or smaller trees, sticks, branches or bushes. Some of these smaller specimens appeared to be in possible alignments in the 2012 sonar record, suggesting the possibility of fish weirs or other features constructed near-shore.

During investigation of these targets water visibility was near zero but divers could determine the limits of the exposed materials by feel (smooth bottom downstream versus abundant biomass upstream and upslope, away from the thalweg). Four tree stumps were measured by the diver wrapping his arms around the stump; their diameters were noted to be greater than 1 foot with one almost 3 feet (~ 1 m) in diameter. Samples of this stump (fig. 12) were collected, including a broken off rootlet from one main root trunk into the sediment bed. A portion of this specimen was radiocarbon dated to 7300 +/- 40 YBP (Beta 36234). This is a significant age, indicating the age of a tree preserved in a surface that was probably flooded during and after MIS 1, after 7,300 YBP. The surface was at 28 feet (9 m) at the time of the 2012 dive operations; the root was from about 1 foot (20 cm) below the surface exposure.
C 282 will not be investigated in 2013 but future studies are planned. Samples will be collected by divers to establish the various arboreal taxa present as well as their respective ages. If possible, dendroclimatology studies will be conducted on cross-sections of selected samples.

**Summary and Conclusions**

A multi-method approach to the studies of these four example sites has stressed the use of scientific diving as a key element. Combined with geophysical and sediment sampling methods, diving made possible the controlled and systematic recovery of materials found on these sites. Only one of these four sites has been eliminated as a potential prehistoric archaeological site, C 41, but the other three remain...
active study locations because of the nature of the invertebrate assemblages coupled with the discovery of drowned prehistoric trees (C-282). The key defining attribute of all prehistoric archeological sites – artifacts - have not yet been found. Continued study by divers and sediment sampling techniques will focus on recovering definitive prehistoric cultural remains that may include lithic material, shell artifacts, bone/horn items, pottery and organic items such as wood and/or woven materials. To date the results may be only indicative of prehistoric garbage. That being said, however, further collection may find evidence for the folk who produced the garbage.

References


