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Finding Historic Shipwrecks in the Dynamic Coastal Environment of Winyah Bay: A Geoarchaeological Approach

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FINDING HISTORIC SHIPWRECKS IN THE DYNAMIC COASTAL ENVIRONMENT OF WINYAH BAY: A GEOARCHAEOLOGICAL APPROACH

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TITLE SLIDE

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There are hundreds of shipwrecks recorded in the waters of South Carolina. Map of U.S. naval wreck representative of distribution.

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The majority of these losses occurred around Charleston Harbor and Port Royal Sound and reflects the strategic and economic nature of those two regions.

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The Winyah Bay region, containing the third natural harbor in the state, saw neither historic sea battles nor page-turning events associated with the two conflicts that ravaged the state. Notwithstanding, between 1733 and 1916, the approaches to the Bay saw some 131 ships fall prey to the treacherous shoals formed by the third largest estuary on the East Coast of the United States.

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These range from 18th century English ships of trade to an early 20th century U. S. Naval craft.

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Foremost among these maritime casualties is a body of Southern blockade-runners that met their demise while attempting to elude the ships of the federal South Atlantic Blockading Squadron during the Civil War, as well as other Union and Confederate steam-powered vessels that failed to navigate successfully the area’s treacherous waters.

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Winyah Bay also includes the wreck of Admiral Dahlgren’s flagship, *Harvest Moon* that hit a Union torpedo while navigating the Bay. The largely-buried remains of the vessel were the subject of remote sensing and hydro probing during the 2003-04 U.S. Naval Wreck Survey fieldwork.

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The area also potentially contains one of the earliest shipwrecks in North America. The ill-fated *nao* was one of six vessels used during a failed attempt by the Spanish to settle the Southeast of North America during the early years of the 16th century. The Spanish Crown sought to control these expeditions and thereby reap the benefits from them, through issuing patents to individuals in favor with the court. However, these individuals of wealth and high position organized and financed the quests with objectives that included the search for wealth, slaves, and colonization.
In 1520, Lucas Vazquez de Ayllon, a lawyer by profession, moved from Spain to Hispaniola, there investing heavily in gold, sugar plantations, and slaves. He also secured several positions of power in the colony in the process, including auditor, judge and as a member of the powerful Royal Council of Hispaniola. At his own expense, de Ayllon financed an expedition in 1520/21, ostensibly to procure slaves from other parts of the Caribbean.

Coming up empty handed, that expedition ended up exploring regions of the East Coast of North America from the Carolinas to the Chesapeake. Under a 1523 patent from the King, de Ayllon sponsored two further voyages to the East Coast, expanding the exploration southward to northern Florida. The third voyage, in 1526, lead by de Ayllon himself, was clearly for colonization purposes and de Ayllon’s destination was modern-day Winyah Bay, near the River Jordan (modern-day North Santee River) so named by the pilot of the 1521 expedition.

Six ships departed Hispaniola in mid-July 1526 carrying nearly 600 people including slaves, doctors, clergymen, surgeons and sailors, as well as women and children and nearly 100 horses along with copious supplies of corn, bread, olive oil and livestock.

On August 9, lookouts aboard the lead vessel, their Capitana, sighted Cabo San Roman (modern-day North Island) and attempted to enter the bay.

The Capitana, with de Ayllon, and carrying many of the expedition’s supplies, was lost at the entrance to the bay as the crew attempted to work the ship over the bar, foreshadowing the subsequent failure of the Spanish settlement effort three months later.

Researchers have debated and speculated for decades about the location of the final resting-place of the shipwreck; however, historical documents clearly suggest Winyah Bay as the vessels final resting place.

During the early 1990s, James Michie, a researcher working jointly through USC and Coastal Carolina University, conducted two land-based surveys to locate Ayllon’s failed colony, and to locate visible evidence of the wreck that might have been deposited on the beaches. Neither survey provided evidence of cultural materials, leading Michie to conclude that given the dynamic movement of the barrier islands and coastal shoreline associated with Winyah Bay it is entirely likely that the Capitana lies buried beneath the barrier islands.
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The wreck-specific survey for de Ayllon’s lost *Capitana* is in its third season. However, the sheer number and types of vessels that met their demise on the extensive shoals that guard the approaches to Winyah Bay has urged us to launch a comprehensive survey of the region. The survey's objective is to assess the scope of existing submerged cultural resources in the region as is being done in Charleston Harbor and Port Royal Sound, the other natural harbors in the state. Preliminary research suggests that the majority of the vessels that became shipwrecks in the sands off Winyah Bay were vessels of trade and therefore represent a cross section of trade and commercialism through time. These vestiges of America’s rich cultural heritage provide archaeologists with an opportunity to explore a broad range of cultural and temporal research questions.

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While the majority of these wrecks resides in the existing shoals and can be searched for, if not located, using traditional vessel-deployed technologies, some wrecks likely lie at paleoshoal positions or possibly buried beneath landscapes that have accreted over the 500 years of vessels visiting the coast.

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Comprehending the geological transformation of the ocean/bay interface is key to improving the ability to locate potential historic shipwrecks in this dynamic and evolving environment, particularly because older maps and documents use the natural features to describe the original location of wrecks.

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These natural features are largely masked by the results of coastal engineering beginning in the late nineteenth century that has caused extensive sediment accretion, infilling the relic channels and shoals and extending the barrier islands offshore by several kilometers.

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Reconstructing shoreline, harbor-entrance, and shoal configurations for the preceding centuries is essential to aid in locating historic shipwrecks. The U.S. Coastal Survey of the area first documented the overall configuration of the shoals, entrance, entrance channel, and shorelines surrounding the Winyah Bay area clearly in the 1850’s.

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Prior to those initial surveys, a few regional maps from the 1600s and onward have survived. However, the regional nature of the maps and sketches obscure details of the configuration of the coastal features.

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Despite this lack of formal documentation, the marshes, barrier islands, and headlands provide clear evidence of former shorelines and active coastal areas in the form of barrier beach ridges.

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Coastal geologists have studied modern morphodynamics in the coastal systems in South Carolina and established a geomorphic model for the entrance to Winyah Bay. Michael Hayes (USC) developed a conceptual framework of the association between coastal processes and coastal landforms with his classic study focusing on the South Carolina region. Within this mixed-energy mesotidal and wave dominated system, large ebb tidal deltas are typical adjacent to coastal inlets and at the mouths of estuaries.
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Longshore transport in this region carries sediments generally to the south, extending spits and shifting ebb deltas to the south in these coastal compartments. The steady rise in sea level over the last 500 years (ca. one foot per 100 years) has further changed the shorelines.

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The landforms created during the migration and modifications of the coast are clearly visible where preserved.

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Historical shoreline surveys and coastal maps clearly indicate a large ebb-tidal delta system with a southward-oriented primary channel exiting the Winyah Bay entrance. This southward orientation of the coastal shoals was redirected by jetty installation between 1890-1904 and by subsequent dredging operations designed to aid navigation into the harbor. The two existing jetties extend two kilometers (1.2 miles) from the North Island and six kilometers (3.7 miles) from South Island into the Atlantic Ocean.

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While historical shoreline data for the area extend back to approximately 1854, few studies have focused on the configuration and evolution of the bay entrance prior to these historical surveys.

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Recently, Eric Wright a coastal geologist with Coastal Carolina University (2002) presented data on the sediment budget of North Island spit at the northern edge of the Winyah Bay entrance as part of the USGS-SC Sea Grant Coastal Erosion Program studying the Myrtle Beach/Grand Strand area to the north. Using existing false-color infrared photography and high-resolution black and white photography, he identified relic shorelines.

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He then surveyed these shorelines with ground penetrating radar to identify subsurface locations for geochronology. At each of these sites, Wright collected vibracores, which he described and sub sampled for luminescence or radiocarbon dating. Luminescence geochronology provides a means for determining the age of the last exposure of silicate minerals to sunlight or the age of sediment burial. In areas believed to be greater than 300 years old and when suitable high organic conditions are encountered, radiocarbon age estimation techniques were used to refine the chronology and test the concordance between the methods. Using these methods, Wright and company recognized and dated a series of paleospit shorelines ranging from recent to approximately 1,000 years before present.

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The proposed geological work will build off these coastal evolution and sediment budget studies by defining the paleogeography of the Winyah Bay entrance to the south of the harbor entrance and refining the existing data to the north.
Archaeologically, thus far, we have surveyed some 43 square kilometers (16.5 square miles) of the approaches to Winyah Bay, predominantly to the south of the entrance.

We have identified at least five shipwrecks within the project area using aerial reconnaissance and traditional survey techniques…

Including the Sea Robin, a modern shrimp trawler that fell afoul of the unforgiving rocks of South Jetty…

as well as numerous other sites of modern attribution.

Three sites contain boilers and extensive iron structure-steamships.

By overlaying the mid-1900s shoals (outlined in red) on the GIS of the survey area, the 19th century steamship wrecks can be seen on the historic shoals, while the more modern sites, which include water pipe, concrete debris, and a boat trailer, are more evenly distributed across the survey area.

Based on this 1890s chart and contemporary written descriptions of ship losses, the steamship wrecks are tentatively identified as the Union steamships National, Osceola, and Arathusa, and a Confederate blockade-runner Sir Robert Peel.

However, it is an 1855 chart that draws us back to the need for geoarchaeological studies of the area. This chart clearly shows a wreck near the shoreline of Sand Island (right). Georeferencing that wreck location on the modern NOAA chart places it some two kilometers inland of the modern shoreline.

Maritime Archaeology is strongly dependant upon historical and cartographic records for locating shipwrecks. However, the shorelines, shoals, and other natural features used to describe wreck locations are constantly being remodeled by natural and man-made processes. Thus, it is imperative to incorporate geoarchaeological studies with archaeology in order to reconstruct paleo-landforms as described in written accounts.
This project, when completed, will result in a series of extensive archaeological investigations around the approaches to the historical harbor entrance to Winyah Bay, South Carolina. It will also provide archaeologists with a geoarchaeological framework within which to enhance discovery of sites that reside in dynamic coastal environments, notably around coastal inlets by:

- Creating a paleogeographic reconstruction of the entrance to Winyah Bay, including island, shoreline, and approximate shoal positions since the early 1500s, and
- Correlating the historic and cartographic shorelines with the paleogeographic reconstruction locations.

Based on the successful outcome of those two objectives, archaeologists will be able to develop a strategy for investigating selected high probability areas on the barrier islands that have the potential to contain shipwrecks.

To find out about this and many other underwater archaeology projects conducted by the South Carolina Institute of Archaeology and Anthropology’s Maritime Research Division go to http://artsandsciences.sc.edu/sciaa/mrd/mrd_index.html
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UNIVERSITY OF SOUTH CAROLINA
COLLEGE OF CHARLESTON
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pre-1850’s shoreline/ridge complexes
Puerto Plata

ESPANOLA

Santo Domingo

Puerto Plata

ESPANOLA

Santo Domingo
WINYAH BAY

LUIS VAZQUEZ DE AYLLON’S
1521, 1523 AND 1526 VOYAGES

CREIGHTON/
SAPELO
ISLANDS
Inlets and Bays

- Morphology
  - Spit
  - Offshore bars/shoals
- Short term change
- Long term change
pre-1850's shoreline/ridge complexes
Where were the shorelines?
PROJECT OBJECTIVES

• Conduct a series of extensive archaeological investigations around the approaches to the Winyah Bay historical harbor entrance.
• Provide archaeologists with a framework within which to enhance discovery of sites that reside in dynamic coastal environments.
• Create a paleogeographic reconstruction of the entrance to Winyah Bay, including island, shoreline, and approximate shoal positions since the early 1500s.
• Correlate the historic and cartographic shorelines with the paleogeographic reconstruction locations.
• Develop a strategy for investigating selected high probability areas on the barrier islands that have the potential to contain shipwrecks.