

STUDY TITLE: Examining and Testing Potential Prehistoric Archaeological Features on the Gulf of Mexico Outer Continental Shelf

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CONTRACT NUMBER: M07AC13373

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA(S): Central and Western

FISCAL YEAR(S) OF PROJECT FUNDING: 2007-2012

COMPLETION DATE OF REPORT: October 2015

COSTS: \$367,095

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KEY WORDS: Gulf of Mexico, submerged prehistoric sites, remote sensing survey, coring

BACKGROUND: Previous remote sensing work on the Outer Continental Shelf (OCS) has identified two high probability areas (South Marsh Island, LA, and Galveston, TX) with potential prehistoric sites in the Western and Central planning areas located within the upper 5 feet of sediment. A third area in High Island Area, Western planning area, contains a deeper feature that was tentatively identified as a midden located approximately 12 feet below the seafloor. The proposed project directly relates to the core mission of BOEM by addressing potential socioeconomic impacts to these cultural resources on the OCS by evaluating the current survey guidelines and avoidance criteria for prehistoric features that may be impacted by oil and gas industry development. Because only limited testing has ever been performed, this study attempted to determine if landforms and sites are being identified correctly from the geophysical remote sensing data acquired under guidelines published in NTL 2005-G07, and if these buried landforms/sites do indeed reflect, or actually are preserved prehistoric sites.

OBJECTIVES: The objectives of this study were to: 1) determine the accuracy of terrestrial analogues and the time, space, mechanism model for identifying high probability areas for prehistoric site occurrence and preservation in the wider Gulf of

Mexico (GOM) OCS planning districts; 2) determine if the core analysis data identified in previous studies represent a universal set of characteristics indicative of prehistoric archaeological deposits, or is either aerially restricted to the Sabine River Valley or temporally restricted to the Paleoindian period; 3) identify additional core analysis that suggest, or are indicator factors for archaeological deposits; 4) assess the optimal line spacing for acquisition of sub-bottom profiler data to detect geologic and potential archaeological features; and 5) identify possible discrete archaeological features that are located within depths that can be tested through excavation.

DESCRIPTION: Geophysical data were collected in July 2008 on board the R/V *Acadiana*. A total of 6 sites were surveyed. Coring operations were completed in July 2009 on board the R/V *Thunderforce*. A total of 30 cores (totaling 136 sections) were extracted from four separate areas at (lease area and block number) High Island 178, High Island 160, Galveston 426, and Galveston 356 and were processed at LSU. Cores were analyzed for lithology, grain size, mass-specific magnetic susceptibility, foraminifera and pollen, and P-wave velocity. In addition, Fourier Transform Infrared (FTIR) spectroscopy was performed and radiocarbon samples were collected.

SIGNIFICANT CONCLUSIONS: A review of existing sea level curves was conducted, and a new composite curve created specifically for use in this study. The composite sea level curve was successful in defining the minimum and maximum dates for final inundation at all of the sites; exceptions included the shell sample from HI 160 (taken from an interpreted subaqueous horizon), and the anomalously old dates returned for samples from within the shell deposit in GA 426. Evidence of the operational environments in both HI 178 and GA 426 demonstrate that each area supported resources exploited in prehistoric subsistence systems. Pollen species identified in the cores from both HI 178 and GA 426 represent food sources exploited by prehistoric populations, and even species developed as cultigens in later contexts. Future coring or sediment sampling strategies should be designed to allow for pollen analysis relative to seasonality or other indicators that would allow for distinction between likely periods for wildfire so as to identify modification of the operational environment. Radiocarbon dates from this study confirm that archaeological horizons exist offshore that correlate with known periods of occupation by Paleoindians and Early Archaic peoples in Texas and Louisiana. Sediment analyses yielded data representing hospitable environments with resources known to have been exploited by prehistoric populations. The combined results from this study confirm that geographical and operational environments can be detected by geophysical data (acoustic survey and physical sampling).

STUDY RESULTS: Existing acoustic survey data were used to delineate large-scale geographical environments within all four survey areas. Closer interval survey lines (150 m, 50 m, and 25 m) provided detail over areas of interest. Independent data sets were correlated to provide a more detailed reconstruction of the operational environments. Evidence of fire was identified from Paleoindian-age operational environments in both HI 178 and GA 426. Charcoal was only identified in one core from HI 178, indicating the fire was spatially restricted to the terrace feature sampled by core no. 1. No evidence of fire was indicated by the remaining cores. The charcoal may refer to either a discrete localized burn, such as a hearth, or a terrace-wide burning event that did not reach the

other channel margin. Charcoal identified across several cores in GA 426 suggests a wider burn area, but it is unclear if it was due to a natural fire, or a fire that was intentionally set by humans to modify the landscape.

STUDY PRODUCT(S): Evans, A.M. 2016. Examining and Testing Potential Prehistoric Archaeological Features on the Gulf of Mexico Outer Continental Shelf. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. CMI Study 2016-015. 366p.

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