

STUDY TITLE: Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments

REPORT TITLE: Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments: Final Report

CONTRACT NUMBER: M12AC00016

SPONSORING OCS REGION: Atlantic

APPLICABLE PLANNING AREA(S): Atlantic

FISCAL YEAR(S) OF PROJECT FUNDING: 2012–2019

COSTS BY FISCAL YEAR (Ending June 30): FY2013: \$564,197.98; FY2014: \$513,926.04; FY2015: \$302,261.05; FY2016: \$286,092.61; FY2017: \$139,407.10; FY2018: \$152,483.10; FY2019 (through Feb 28): \$41,632.12

CUMULATIVE PROJECT COST: \$2,000,000

COMPLETION DATE OF REPORT: March 2020

PROJECT MANAGER(S): Brian Jordan

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KEY WORDS: archaeology, assessment, best practices, capacity building, collaboration, consultation, geoarchaeology, geophysical, geotechnical, landscape, model, paleocultural, paleoenvironment, paleolandscape, preservation, reconstruction, sediment coring, site, subbottom profiling, submerged, Tribal

BRIEF ABSTRACT: The Outer Continental Shelf (OCS) of the United States is increasingly becoming the focus of conventional and renewable energy development to meet the nation's energy needs. Consideration of the effects this development may have on submerged Native American (Tribal) historic properties is a legislatively mandated responsibility for Federal agencies, including the United States Department of the Interior's (DOI's) Bureau of Ocean Energy Management (BOEM), which reviews and permits these undertakings. It is also a significant concern for individual states, Tribes, other regulatory agencies, stakeholders, and researchers that participate in the environmental review process for offshore development projects. This project developed best practices to improve the effectiveness of Tribal engagement and geoarchaeological site characterization associated with the permitting process for offshore energy development on the OCS.

BACKGROUND: During BOEM's 2011 Atlantic Wind Energy Workshop, participants identified two critical management priorities: 1) the development of geospatial databases of known submerged Tribal cultural sites on the OCS; and 2) the development of standardized methodologies for identifying these sites (Cahill et al. 2011*). In response to these needs, the Coastal Mapping Laboratory at the University of Rhode Island's Graduate School of

* Cahill, M., Olsen K, Blaha D, Tims J, Finio A, Todorov M, Ewald J, Primo J, Medley L, Bigger D, Skrupky K, Hooker B, Jordan B, Dhanju A. 2011. Atlantic Wind Energy Workshop summary report. Herndon (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Regulation, and Enforcement. OCS Study BOEMRE 049-2011. <https://espis.boem.gov/final%20reports/5124.pdf> . 78 p + apps.

Oceanography (URI-GSO) and its research partners, the Rhode Island Coastal Resource Management Council (RI CRMC) and the Narragansett Indian Tribal Historic Preservation Office (NITHPO), submitted a joint proposal to BOEM in 2012 entitled “Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments” (hereafter, “the project”). This proposal led to a cooperative agreement between URI and BOEM, with CRMC and NITHPO as research partners, to conduct a five-year study consisting of geoarchaeological predictive modeling to assist with identifying submerged sites, geoarchaeological investigations at five case study areas in nearshore and offshore Rhode Island waters, and best practice development.

OBJECTIVES: The overall goals of the project were to 1) enhance and refine the scientific understanding of submerged paleocultural landscape preservation and distribution on the Rhode Island OCS, with particular emphasis on areas of Tribal significance; 2) contribute to the development of a clearly-defined, standardized methodology to identify submerged areas with cultural significance to contemporary Tribal people; and 3) assist with the development of effective, culturally sensitive collaboration and consultation between federal and state agencies, researchers, and Tribes who work together as part of the NHPA Section 106 compliance process.

METHODS: Project goals were met by completing six interrelated tasks (see Study Results, below, for description), each of which required a unique approach and workflow. In general, tasks were accomplished by a combination of a) outreach and collaboration between the project team and Tribal, agency, and academic collaborators; b) synthesis of legacy data in each study area (Figure 1); c) underwater archaeological surveys off of Cedar Tree Beach and West Beach (Figure 1); and d) acquisition and analysis of seismic reflection profiles and sediment cores at five case study areas (Figure 1).

STUDY RESULTS: Each of the project's six tasks resulted in a written or digital data deliverable summarizing the goals, methodology, and outcomes for that task. Each task is summarized below, with the associated deliverable in parentheses. Deliverable citations are provided below as Study Products.

- 1) An initial 3-day project workshop, which provided a forum for a multicultural, multidisciplinary exchange of information, ideas, and project recommendations for Tribal, agency, and academic participants (Coastal Mapping Laboratory 2015)
- 2) A comprehensive "desktop study" that compiled archaeological, geological, and geophysical data applicable to the project goals into a digital geospatial database (Gibson et al. 2018)
- 3) Development of best practices for a) agency, Tribal, and research community engagement in support of submerged paleocultural landscapes and historic properties identification and protection; and b) assessing paleocultural sensitivity and identifying submerged paleocultural sites on the OCS (Robinson et al. 2018)
- 4) Assessment of the applicability of terrestrial geoarchaeological predictive modeling techniques to the submerged environment, and the development and testing of a new predictive model of paleolandscape preservation for the southern New England OCS (Robinson et al. 2020)
- 5) Assessment and refinement of archaeological, geophysical, and geological field survey methods associated with paleocultural landscape identification in submerged environments (Caccioppoli et al. 2018)
- 6) A documentary film that includes interviews with project participants and summarizes the project goals and results (DeCiccio 2019)

SIGNIFICANT CONCLUSIONS: Each project task resulted in unique conclusions that contributed to the overall outcome of the project.

- 1) Project workshop: Respectful round table-style workshops that include Tribal, scientific, and agency representatives can improve multicultural communication, assist with understanding diverse priorities, and contribute to the establishment of common goals regarding submerged paleocultural landscape identification and protection.
- 2) Desktop study: A significant body of literature exists regarding the geological history of the southern New England continental shelf, but these datasets require additional verification before forming the bases of paleocultural landscape reconstructions. Virtually all of the archaeological investigations in the area have focused on the onshore environment with no previously identified submerged paleocultural sites known in any of the project study areas. Several well-researched sea level rise curves exist for the area, but produce substantially different paleoshoreline reconstructions that must be considered as a range.
- 3) Best practices: Additional development in three key areas is required to optimize successful consultation between agencies, Tribes, and researchers: a) communication; b) relationship building; and c) capacity building. Improvement in each of these areas is essential to the identification and protection of submerged paleocultural landscapes in the offshore development project review process. Potential development sites on the OCS should be characterized in a phased process that includes a) a thorough desktop study resulting in a geospatial synthesis of existing geoarchaeological information in the study area; b) an examination of sea level rise models and the development of multiple paleoshoreline reconstructions based on each model; c) a detailed reconstruction of the complete subsurface stratigraphy of the study area on a regional scale and identification of stratigraphic facies potentially associated with human habitation; d) paleoenvironmental reconstructions of the study area for the time period of hypothesized habitation of the area; and e) assessment of the paleocultural sensitivity of preserved paleolandscapes in the study area.
- 4) Predictive modeling: Application of archaeological predictive models analogous to those developed for the onshore environment have not yet been realized for the OCS because of the absence of essential geoarchaeological data. Until such data becomes available, development is recommended of regional geological models based on subsurface stratigraphy to identify areas of the OCS where paleolandscapes that could contain cultural sites are preserved. The project model is based on identifying stratigraphic units that are associated with the time period of human habitation on the OCS prior to post-glacial sea level rise and understanding which units represent paleoenvironments that were subaerially exposed and available for human habitation during periods of lower sea levels. The identification of three submerged paleocultural sites during the project reinforced the applicability of the stratigraphic model and demonstrated that submerged sites can survive marine inundation and be preserved underwater.
- 5) Field survey methods: Study area characterization should include both CHIRP and BubblePulser seismic reflection systems to adequately record the complete subsurface stratigraphic section. Sediment coring is essential to ground truth the acoustic interpretations and should not be regarded as optional. Close-interval gradiometric survey, visual sediment probing, and non-disturbance visual investigations of areas of the ocean floor with exposed or shallowly buried paleolandscapes are effective alternative geoarchaeological paleocultural site identification techniques. Non-disturbance survey methods are strongly preferred by Tribes.

STUDY PRODUCT(S):

- 1) Coastal Mapping Laboratory. 2015. Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments: summary report of the initial project workshop. Prepared by the Coastal Mapping Laboratory, Graduate School of Oceanography/University of Rhode Island. Herndon (VA): U. S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2015-048. 44 p. with appendices.
- 2) Gibson CL, Robinson DS, King JW. 2018. Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments: digital data set description. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. 8 p with accompanying digital files.
- 3) Robinson DS, Gibson CL, King JW. 2018. Developing protocols for reconstructing submerged paleocultural landscapes and identifying Native American archaeological sites in submerged environments: best practices. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2018-055. 55 p.
- 4) Robinson DS, Gibson, CL, Caccioppoli, BJ, King JW. 2020. Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments: geoarchaeological modeling. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2020-024. 175 p.
- 5) Caccioppoli B, Robinson D, King J, Gibson C. 2017. Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments: field report 2013–2016. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2018-056. 61 p.
- 6) DeCiccio A. 2019. The submerged paleocultural landscapes project: a collaborative approach for identifying ancient Native sites on the continental shelf [documentary video]. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. Runtime approximately 30 minutes.

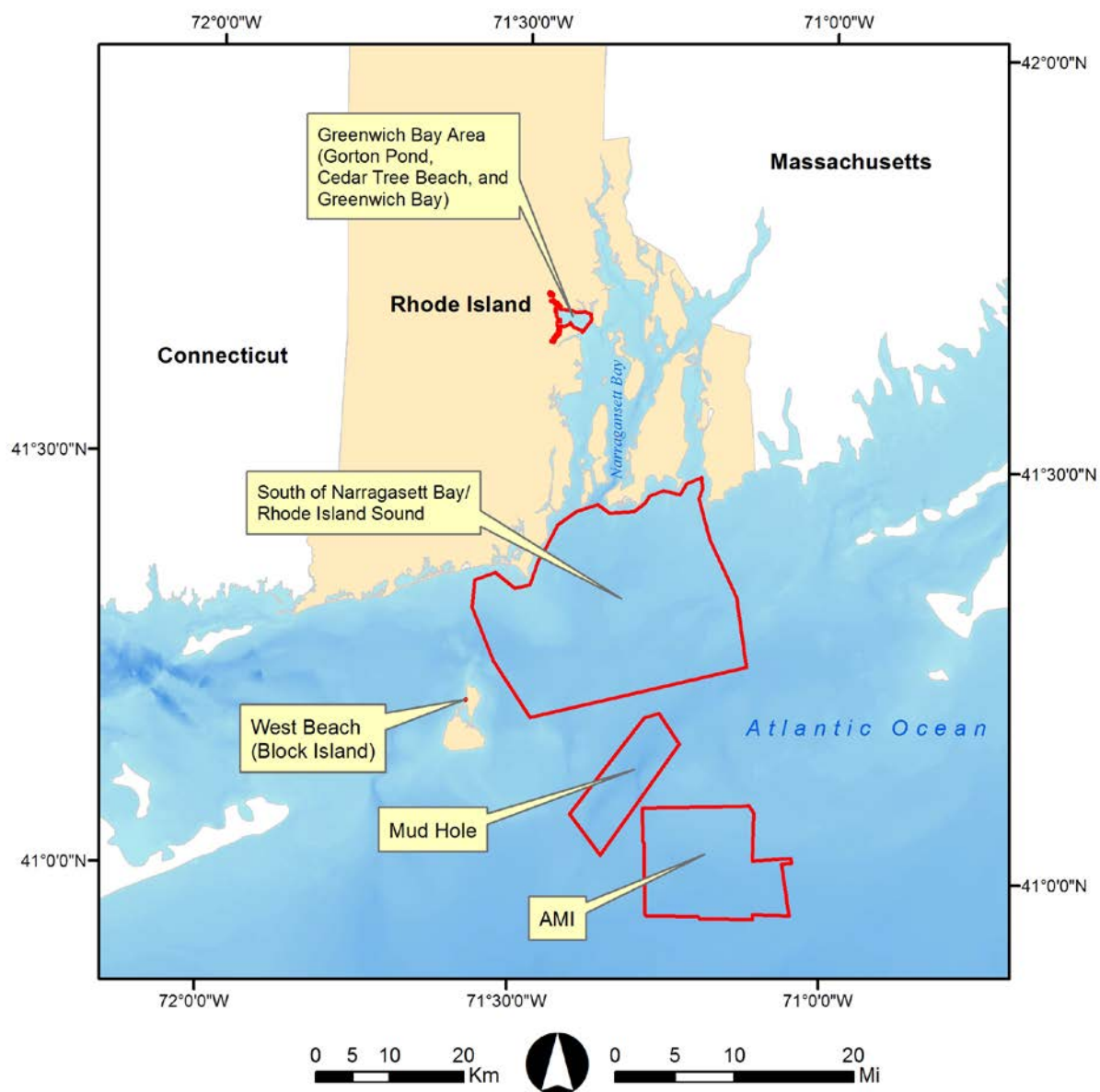


Figure 1. Location of study areas in nearshore and offshore waters off Rhode Island.