

Environmental Studies Program: Ongoing Studies

Study Area(s): Atlantic

Administered By: BOEM, Office of Renewable Energy Programs

Title: Battle of the Atlantic Expedition

BOEM Information Need(s) to be Addressed: An inventory and evaluation of World War II vessel losses offshore North Carolina is needed to inform BOEM's consideration of historic properties under the National Historic Preservation Act. This information is timely and relevant as BOEM is currently considering renewable energy activities in this area.

Total Cost: \$500,000

Period of Performance: FY 2010-2017

Conducting Organization(s): Inter-agency partnership between BOEM and NOAA, Monitor National Marine Sanctuary

BOEM Contact(s): [William Hoffman](#)

Description:

Background: BOEM and NOAA, Monitor National Marine Sanctuary have committed to a multi-year project to document the Battle of the Atlantic by conducting archaeological investigation of both Axis and Allied losses during World War II offshore North Carolina. An Interagency Agreement was developed in 2010 to provide support over a five-year period toward documenting these casualties.

Perhaps the longest military campaign of World War II, the Battle of the Atlantic was waged from the waters off England to the east coast of the United States and into the Gulf of Mexico. From its beginnings in 1939 through the end of the war with Germany, hundreds of vessels were lost and are now located on the seafloor as archaeological resources. Given the violent nature of these vessel losses, many are also war graves. The area offshore North Carolina was the closest theater of war to the continental United States.

Objectives: This expedition will identify and investigate Axis and Allied losses in the Graveyard of the Atlantic. The objectives of this project are to collect detailed documentation of these vessels and to develop a complete inventory of WWII losses in the region.

Methods: Methods include historical research and field investigations conducted by marine archaeologists. Field investigations have employed various types of remote sensing survey, video and photo documentation, and use of manned submersibles.

Current Status: The first field expedition, carried out over a three-week period in July 2008, successfully documented the remains of the German U-boats *U-85*, *U-352*, and *U-701*, located in Federal waters. The 2009 Expedition successfully documented the

remains of the converted British military trawler *H.M.S. Bedfordshire*, sunk by *U-558*, as well as completing remote sensing survey operations in deeper water, which identified the remains of the U.S. Navy trawler *YP-389*, sunk by *U-701*. The three-week field expedition in 2010 investigated several shipwreck sites including the oil tanker, *Dixie Arrow*, torpedoed by *U-71*, and the Navy tugboat *Keshena* that struck a mine and sank. The 2011 expedition conducted wide area remote sensing surveys to identify additional targets for investigation as well as shipwrecks associated with the Battle of Convoy KS-520. In 2012, research focusing on targeted multibeam surveys of anomalies discovered in 2011. Eight targeted surveys were completed, with the discovery of at least two previously unknown wreck sites. Additionally, baseline diver surveys were conducted on seven known WWII wreck sites. The 2013 expedition continued the efforts of the previous years, investigating 12 sites to verify their identity and gather information to support consideration of their eligibility for listing in the National Register of Historic Places. In 2013, field methods were also expanded to include the documentation of several sites beyond recreational diving limits through the use of decompression and closed-circuit rebreather diving procedures. During 2014 fieldwork, the team identified the remains of casualties lost during the 1942 attack on the KS-520 Convoy. This includes the German U-boat *U-576* and the tanker *Bluefields* which now rest on the seabed less than 240 yards apart. These sites were further investigated in 2016. Fieldwork under the agreement has been completed and preparation of the final report is underway.

Final Report Due: Spring 2017

Publications Completed: NA

Affiliated WWW Sites:

<http://oceanexplorer.noaa.gov/explorations/16battlefield/welcome.html>

Revised Date: January 23, 2017

Environmental Studies Program: Ongoing Studies

Study Area(s): Atlantic

Administered By: Office of Renewable Energy Programs

Title: Determining Offshore Use by Diving Marine Birds Using Satellite Telemetry

BOEM Information Need(s) to be Addressed: Large marine birds with a diving strategy for foraging migrate and winter along the U.S. Atlantic coast from Maine to North Carolina and beyond. Three species of marine diving birds – surf scoters, red-throated loons and northern gannets - - were selected for study because they represent diverse foraging strategies and are of special concern to the U.S. Fish and Wildlife Service (USFWS) because they all appear to be declining. Their foraging strategies could possibly put them at special risk for collision with offshore wind farms. BOEM needs to know where they concentrate in winter off the U.S. coast, and also, if possible, to define the width and location of their migration corridors.

Total Cost: \$2,058,379

Period of Performance: FY 2012-2017

Conducting Organization(s): U.S. Fish and Wildlife Service (USFWS)

BOEM Contact(s): [Dr. David Bigger](#)

Description:

Background: Specific information is needed on migration corridors and winter concentration areas used by surf scoters, northern gannets, and red-throated loons during spring and fall migratory flights along the U.S. Atlantic coast and Outer Continental Shelf (OCS), especially south of New England to the Carolina Outer Banks, where there is great interest in development of wind energy facilities. These species have been identified as high priority species by the USFWS because of their declining populations, paucity of information on the Atlantic south of New England and/or because of the perceived threat of wind energy development to diving birds. This study will permit delineation of specific fall and spring migration corridors used by these species and will help to identify winter concentration areas for each species.

Objectives: The primary objective is to determine the occurrence and movement patterns south of New England to the Outer Banks of three diving marine bird species with diverse life history strategies: the surf scoter, northern gannet, and red-throated loon.

Methods: The USFWS, through partnerships with the Sea Duck Joint Venture (SDJV), US Geological Survey (USGS), Biodiversity Research Institute (BRI) and Memorial University of Newfoundland, will capture surf scoters, northern gannets, and red-throated loons from December through March and surgically implant satellite transmitters with duty cycles programed to provide locations of these birds in winter and during spring and fall migrations. Boats and experienced crews of BRI and SDJV will be used to capture birds and experienced veterinarians identified by SDJV and

USGS will perform surgical implantations of transmitters. Memorial University of Newfoundland's Monteverchi Laboratory will also attached satellite transmitters externally at the base of the tail feathers of northern gannets. USGS will also conduct tests of externally-attached, solar powered satellite transmitters.

Each year, 15 birds of each species will be captured offshore during fall and winter for three years and fitted with surgically implanted satellite transmitters with a battery life of less than one year. Transmitters will be programmed to send data during winter and migratory periods when birds are most likely to occur in the study areas. To assure that transmitted birds will yield data on movements south of New England, most birds will be captured off the Outer Banks of North Carolina and off the Chesapeake Bay. Satellite data will be collected and analyzed to determine the locations of these birds throughout the life of the transmitters. During a fourth field season, an additional 25 birds of each species will be captured and fitted with transmitters.

Current Status: BOEM received annual reports for field work in 2012, 2013, and 2014. The final report is currently being drafted.

Final Report Due: July 31, 2017.

Publications/Presentations:

Gilbert, A. 2016. Spatial Use of the Atlantic OCS by Vulnerable Marine Birds. (*In:* Boatman, M.C. (Ed.). 2017. [Atlantic Ocean Energy and Mineral Science Forum](#), November 16-17, 2016. US Dept. of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia. OCS Study BOEM 2017-016. 695 pp).

Affiliated WWW Sites: <http://www.briloon.org/surf-scoters-determining-offshore-use-off-mid-atlantic-using-satellite-tracking>

Revised Date: March 2, 2017

Environmental Studies Program: Ongoing Studies

Study Area(s): Atlantic

Administered By: Office of Renewable Energy Programs

Title: Quantitative Assessment of Spatially Explicit Social Values

BOEM Information Need(s) to be Addressed: This study will provide BOEM decision-makers with an enhanced understanding about the relationship between marine space use/non-use, the type and intensity of place-based attachments and value orientations in regions adjacent to WEAs, and the likelihood of local engagement in action to support or oppose renewable energy projects. The study also will help BOEM and developers understand and negotiate the varying cultural importance of areas targeted for alternative energy projects.

Total Cost: \$400,000

Period of Performance: FY 2015-2018

Conducting Organization(s): NOAA National Ocean Service (NOS), National Centers for Coastal Ocean Science

BOEM Contact(s): [Brandi Carrier](#)

Description:

Background: Baseline information on the spatial footprint of human activities in our nation's coastal and marine environments is increasingly available. For example, the recently completed studies, "Identification of Outer Continental Shelf Renewable Energy Space-Use Conflicts and Analysis of Potential Mitigation Measures" and "Bayesian Analysis for Spatial Siting (BASS)," document the spatial footprint of ocean uses and, in the case of the BASS project, use this data to inform siting of renewable energy projects.

Findings from these and other studies have bolstered our ability to identify potential human use conflicts and mitigation measures. However, such studies remain focused on a limited range of stakeholder groups (e.g., scientists, commercial fishers, shippers, etc.), relying heavily on experts from these groups to contribute data or subjective assessments about the uses of and values for contested marine spaces. Members of smaller stakeholder groups and the general public have not been routinely or systematically engaged in the collection of human use and value data in a renewable energy context, despite the fact that these groups may also benefit or bear the externalities of such projects. Further, research to date has narrowly operationalized "value" in a spatial planning context. Objectively, value has generally been operationalized as the presence/frequency or economic value of a particular marine activity. More commonly, value has been subjectively operationalized relying on the opinion of "key" stakeholders, informants or experts. Objective data that allow for the assessment of spatially relevant, place-based social values, collected from a scientifically drawn sample of stakeholders or the public, are lacking. The present study will fill this gap.

For this study, the term “values” represents the moral orientation or philosophical framework that shapes a person’s ideals and attitudes and, more importantly, motivates behavior or action. Environmental sociologists have found that people generally fall into one of a few environmental value orientations. Knowing these moral, value and attitudinal orientations has helped researchers and resource managers anticipate the likelihood of persons to engage in individual or collective pro-environmental behaviors. In an energy context, presence of particular patterns of social values, specifically values associated with place-based attachment, have been noted as an important factor in motivating local action to oppose renewable energy projects.

The present study proposes collection of spatially-explicit, value orientation data that is relevant to areas planned for alternative energy development. The approach could be used in all regions, at multiple spatial scales, or with particular stakeholder groups. The goal of the project is to learn which value orientations are most highly correlated with particular geographies and to develop models to predict who is more likely to support and oppose renewable energy projects in the region.

Objectives: The present study includes collection of spatially-explicit, value orientation data that is relevant to areas planned for alternative energy development. The goal is to gain a better understanding about which values are most highly correlated with specific locations in a region proposed for development, and to develop models to predict who is more likely to support and oppose alternative energy projects, and why. Collection and analysis of this type of social data will allow for objective assessment of which areas across the seascape are valued by the public and/or stakeholder groups (and to what degree/intensity), how and why, along with how different areas compare both in terms of uses and values.

Methods: This project is being conducted in North Carolina, although this approach could be used in any regions, at multiple spatial scales, or with particular stakeholder groups. The data required to conduct such an analysis are:

- value profiles—identification of the environmental value typology of stakeholders, as well as the type of sociocultural value(s) attached to a place or space;
- value rankings by geographic location—the intensity of a group’s attachment (i.e., level of concern) to particular areas within a given space;
- demographic profiles—the demographic and socioeconomic characteristics of focal communities or stakeholder groups; and
- use patterns—the spatial and temporal characteristics of human usage of specific areas: purpose of use, frequency of use, timing of use, etc.

Current Status: The contract was awarded 29 July 2015. The Office of Management and Budget Review provided clearance to move forward with the project in November 2016. Sub-contracting is now being finalized that will enable the data collection work to begin in earnest.

Final Report Due: July 29, 2018

Publications Completed: None, to date.

Affiliated WWW Sites: None, to date.

Revised Date: January 17, 2017

Environmental Studies Program: Studies Development Plan FY 2015-2017

Region: Atlantic

Planning Area(s): South Atlantic

Title: Describing Marine Wildlife Distribution and Movement Patterns on the South Atlantic OCS

BOEM Information Need(s) to be Addressed: Initial renewable energy leasing activities focused on areas along the Atlantic Coast that were ready for such development. As leasing progresses, the potential for additional areas in the South Atlantic is becoming apparent. Baseline information is needed on the distribution and abundance of marine mammal, bird, and turtle species to assist in the environmental review of wind energy areas and in the evaluation of sites in the South Atlantic. BOEM will use this study to begin addressing identified information gaps.

Approximate Cost: (in thousands) \$4,500 **Period of Performance:** FY 2015-2018

Description:

Background: BOEM is responsible for assessing offshore renewable energy projects in the Atlantic planning region, yet recent data is scarce for the South Atlantic OCS. Relatively little known about the distribution and abundance of marine mammals, birds and turtles in the south Atlantic OCS compared to what is known in other regions like the Northeastern Atlantic. This observation is supported by BOEM funded study "[*The Compendium of Avian Occurrence Information for the Continental Shelf Waters along the Atlantic Coast of the United States*](#)" and was discussed at length during the FWS "Marine Bird Science and Offshore Wind Workshop" and the BOEM "Atlantic Wind Energy Workshop" in 2011. It is now time for a multi-year comprehensive baseline ecological study that includes collection of field data, predictive modeling and mapping to build the knowledge necessary for the effective and efficient permitting of offshore wind facilities on the South Atlantic OCS from the Virginia-North Carolina border to Florida.

Given the vastness of the Atlantic OCS and variability in marine wildlife distributions, comprehensive baseline surveys like the one being conducted in the Mid-Atlantic by DOE (<http://www.briloon.org/MABS>) are critical to improving our understanding of current distributions of seabirds, marine mammals, and turtles on the OCS. These surveys would augment ongoing BOEM efforts including the *Atlantic Marine Assessment Program for Protected Species (AMAPPS)*. This study would provide data that will be added into the Compendium of Avian Occurrence Information database and Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP). The data then could be used to update avian and other distributional maps on the Atlantic OCS like those currently be developed through BOEM's interagency agreement with NOAA ([*Integrative Statistical Modeling and Predictive Mapping of Seabird Distribution and Abundance on the OCS*](#)).

Objectives: A multi-season, three-year baseline characterization of marine wildlife in the South Atlantic OCS.

Methods: The general survey approach is similar to the one described in DOE's "[*A Mid-Atlantic Ecological Baseline Studies and Modeling*](#)" that includes a series of boat and high definition aerial video surveys. In all, there will be 24 boat surveys and 24 high definition aerial surveys within three years. The study will build on existing (but not duplicate) efforts such as the interagency *Atlantic Marine Assessment Program for Protected Species* (AMAPPS) which uses conventional aerial surveys. The field data collection effort will include species that are federally or state listed as threatened or endangered as well as any other species of concern and will also include observations of marine mammals and turtles. The general survey design will span three years of observation, with sampling at intervals sufficient to capture seasonal variations in species density and abundance, and cover an area from the federal-state boundary (3 nautical miles) to the 45 meter isobath from the Virginia-North Carolina border to Florida. The effort will be limited to a total area of more than 3,000 square nautical miles in areas where leasing is most likely to occur. Processed survey data will be sent annually to the Compendium of Avian Occurrence Information database and to OBIS-SEAMAP.

Revised Date: March 27, 2014