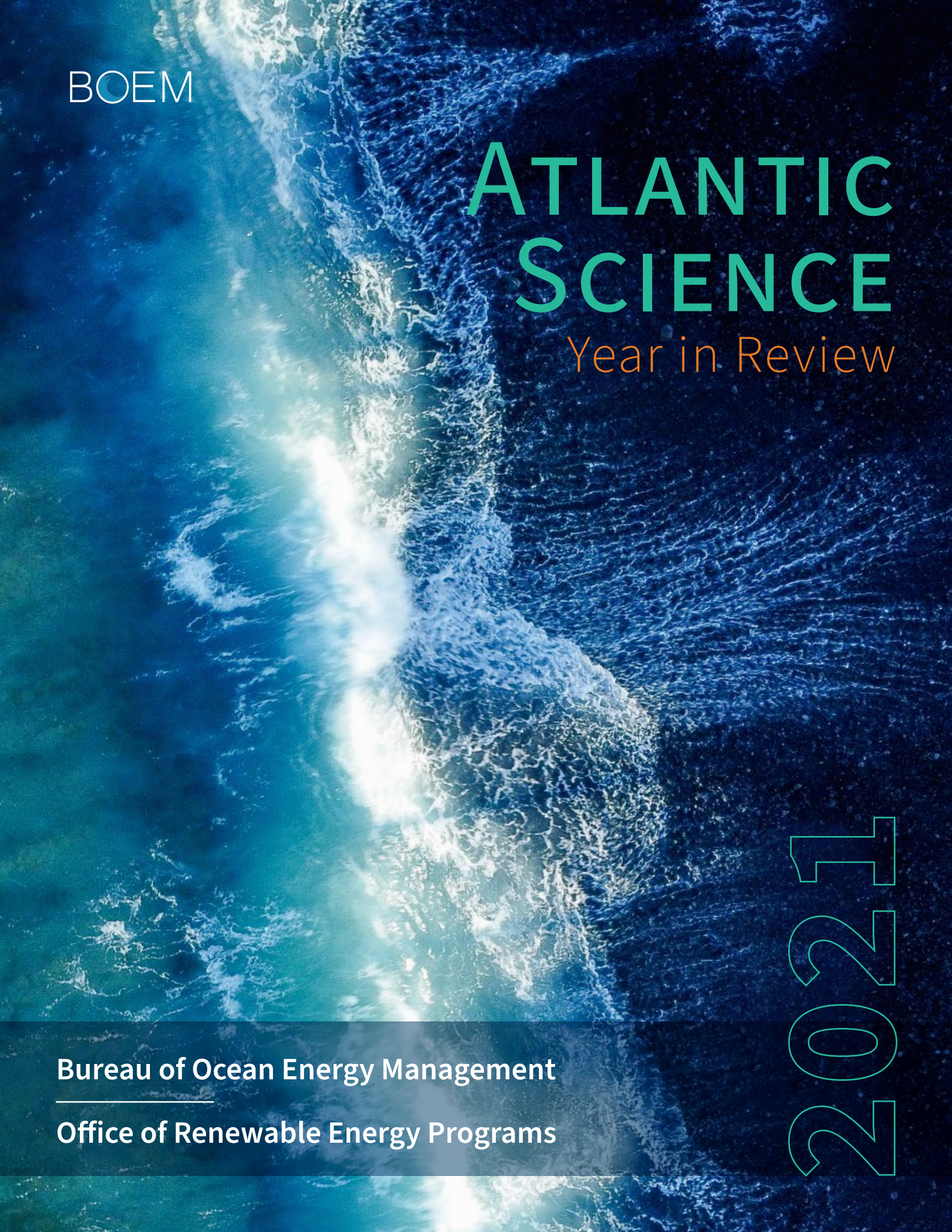

BOEM

Atlantic Science

Year in Review

2021

Bureau of Ocean Energy Management

Office of Renewable Energy Programs

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OVERVIEW

The **Bureau of Ocean Energy Management (BOEM)** funds environmental studies for information needed to predict, assess, and manage impacts from offshore energy and marine mineral activities on human, marine, and coastal environments as mandated under Section 20 of the Outer Continental Shelf Lands Act.

This year in review presents the studies completed in 2021 in support of BOEM's Offshore Renewable Energy Program along the Atlantic coast. The studies represent a broad spectrum of research and monitoring to address a variety of environmental concerns and issues. This review represents a snapshot of the ongoing and completed studies funded in whole or in part by BOEM.

To learn more about other studies, please visit the BOEM website at www.boem.gov.

Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States

As large-scale deployment of offshore wind energy facilities begins in the United States, an important challenge for developers and regulators is the assessment of potential seascape, landscape, and visual impacts on important coastal scenic, historic, and recreational resources; Native American tribal properties and treasured seascapes; commercial interests dependent on tourism; and the private property of coastal residents. This document describes the methodology for seascape, landscape, and visual impact assessment (SLVIA) that the U.S. Department of the Interior (DOI) Bureau of Ocean Energy Management (BOEM) uses to identify the potential impacts of offshore wind energy developments in Federal waters on the Outer Continental Shelf (OCS) of the United States.

The SLVIA has two parts: seascape and landscape impact assessment (SLIA) and visual impact assessment (VIA). SLIA analyzes and evaluates impacts on both the physical elements and features that make up a landscape or seascape and the aesthetic, perceptual, and experiential aspects of the landscape or seascape that make it distinctive. These impacts affect the "feel," "character," or "sense of place" of an area of landscape or seascape, rather than the composition of a view from a particular place. Visual impact assessment (VIA) analyzes and evaluates the impacts on people of adding the proposed development to views from selected viewpoints.

Photo: View of Block Island Wind Farm from Block Island, Rhode Island.

Conducted by:
Argonne National Laboratory

Key Researchers:
R. G. Sullivan

Funded by:
BOEM

Findings

- Methodology for conducting a seascape and landscape impact assessment (SLIA).
- Methodology for conducting a visual impact assessment (VIA).

How BOEM will use this information

- The assessment methodology is provided to wind energy developers to use in the preparation of their construction and operations plans.
- BOEM will use this methodology in assessing the visual impacts from proposed offshore wind developments.

Additional information

Final report:
Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States

Battle of the Atlantic: A Catalog of Shipwrecks off North Carolina's Coast from the Second World War

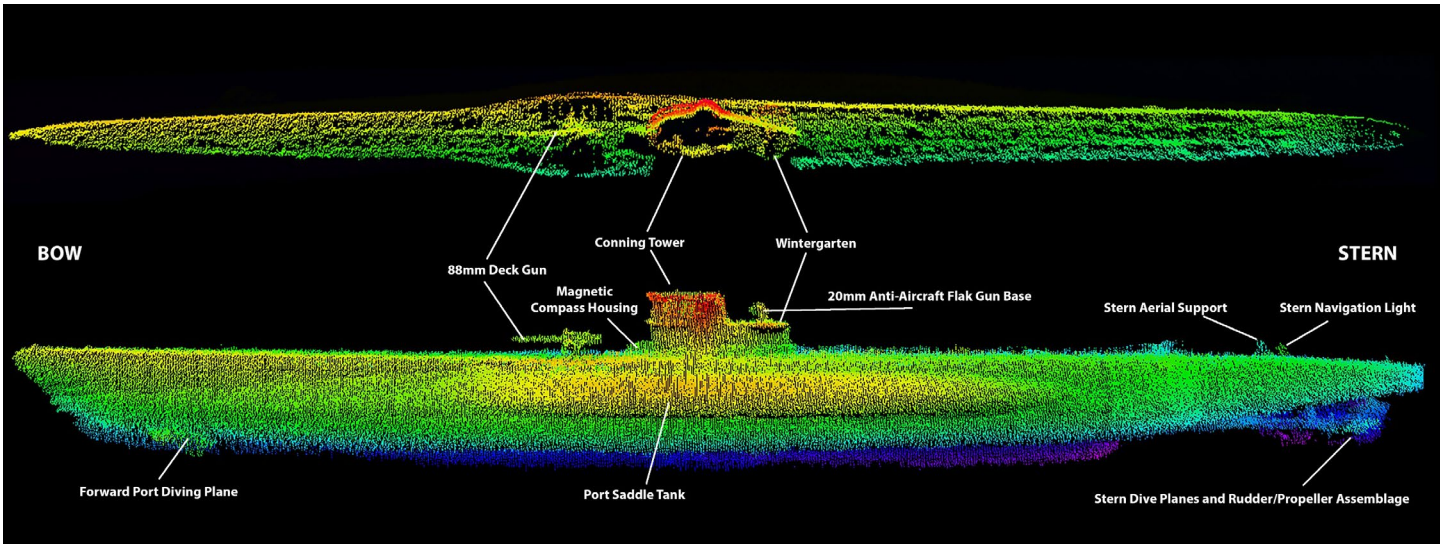


Photo: Processed multibeam point cloud of U-576 in plan and profile view

Conducted by: Bureau of Ocean Energy Management (BOEM) and National Oceanic and Atmospheric Administration (NOAA) Monitor National Marine Sanctuary with multiple contributors*

Key Researchers:
J. Hoyt, J. Bright, W. Hoffman, B. Carrier, D. Marx, N. Richards, W. Sassaorossi, K. Davis, J. Wagner, J. McCord

Funded by:
BOEM and NOAA National Marine Sanctuary Program

The Battle of the Atlantic occurred during World War Two primarily off the coast of North Carolina. The Battle of the Atlantic report summarizes the activities of 8 years of continued research and field operations with a brief accounting of the chronological progression of operations, developing methodologies and technologies employed. The report provides an environmental and historic context necessary for understanding the individual sites offshore North Carolina that were identified and studied by the project. The result of the project is an inventory of sites identified. Ninety-one individual vessel losses constitute all the known (both located and historically reported) casualties off the North Carolina coast during WWII. These vessels area documented in detail using historic and underwater forensic photography, multibeam bathymetry, side scan sonar acoustic imaging, and other technologies.

Findings

- Catalogue of 91 vessels including 79 merchant vessels, 8 Allied military vessels, and 4 German U-boats.
- Discovery of the German Unterseeboot (U-boat) U-576.

How BOEM will use this information

- Ensure that authorized activities such as offshore wind development avoids the shipwrecks.
- Provide information to support listing of historic properties.

Additional information

Final report:
Battle of the Atlantic

** Including NPS Submerged Resources Center; State of North Carolina, the University of North Carolina Coastal Studies Institute (UNC-CSI), and East Carolina University's (ECU) Program in Maritime Studies; and citizen scientists, such as the Battle of the Atlantic Research and Expedition Group (BAREG).*

New York Collaborative Archaeological Survey

BOEM has issued a commercial wind energy lease offshore New York (OCS-A 0512) and, at the time of this study, was planning for additional areas suitable for wind energy development within the New York Bight. Geophysical surveys and historical records are used to identify potential archaeological sites, however, these methods may include locations that are not historical.

BOEM requires avoidance of at least 50 meters from these potential historic locations and absent confirmation that the target has historic value, will err on the side of precaution. Identified geophysical targets (e.g., side-scan sonar contacts and magnetic anomalies) in these areas may prove to be archaeological resources that should be avoided, or they may prove not to be resources and therefore should not prevent development within a specific area of the seafloor. Ten potential sites were investigated during the summer of 2019 in the New York Bight.

Findings

- Four of the ten targets investigated were confirmed to be archaeological sites, and the study recommends avoidance buffers and additional investigation for these sites.
- Five targets do not warrant further investigation, while one wreck was not found.

How BOEM will use this information

- Reduce the impact of wind energy development on archaeological sites by identifying their location and providing a zone for avoidance.
- Assist BOEM in considering the effects of its activities on cultural resources under the National Historic Preservation Act and National Environmental Policy Act.

Additional information

Final report:
New York Collaborative Archaeological Survey

Photo: Wood frames on wreck site of Irma C.

Illustration: Coal barge

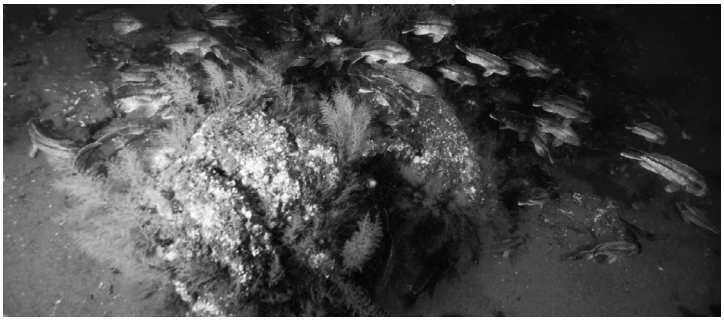


Photo: Remains of a windlass on wreck site of Irma C.

Conducted by: Bureau of Ocean Energy Management (BOEM) and National Oceanic and Atmospheric Administration (NOAA) Monitor National Marine Sanctuary

Key Researchers:
W. Hoffman, J. Hoyt, W. Sassorossi

Funded by:
BOEM

Coastal High Frequency Radar Wind Turbine Interference Mitigation

Coastal high frequency radars (HFR) are used to make high spatial and temporal resolution measurements of sea surface currents over large observation areas. In the U.S., a network of HFR stations maintained in partnership with the U.S. Integrated Ocean Observing System (IOOS) monitors ocean currents across much of the outer continental shelf in U.S. Waters. Observations from HFR radar are used by the Coast Guard's to aid in search and rescue. Wind turbines offshore will interfere with the radar resulting in less accurate measure of currents. A previous study examined the interference using the wind turbines at Block Island Wind Farm and a Seasonde instrument located on Block Island. This study uses the results to develop a software solution to reduce the interference from offshore wind facilities.

Conducted by:
CODAR Ocean Sensors Ltd.

Key Researchers:
D.Trockel, J. Trockel, C. Whelan

Funded by:
BOEM

Findings

- Wind farms are within line of site of 36 radar systems, indicating that they will generate interference to these radars under normal atmospheric conditions.
- Interference in the signal can be significantly reduced using a software solution.

How BOEM will use this information

- Mitigation for the interference will include this software solution.
- Ensure the community is aware of the software solution.

Additional information

Final report:
Coastal High Frequency Radar Wind Turbine Interference Mitigation

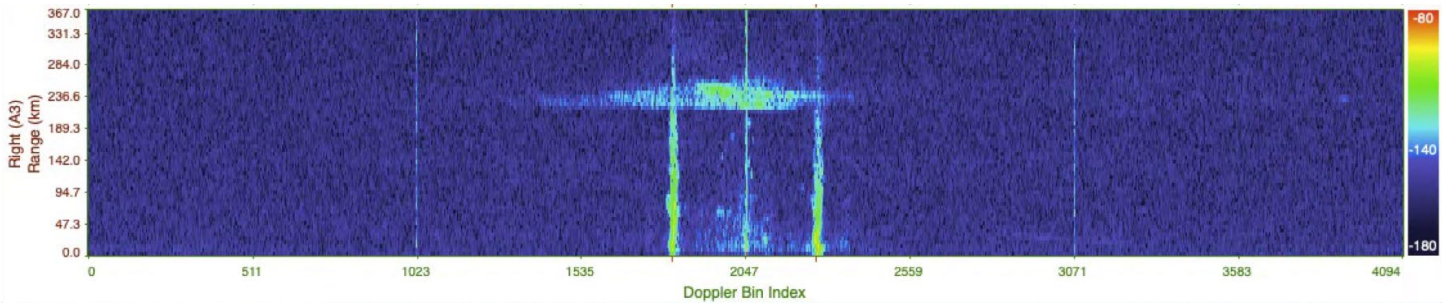
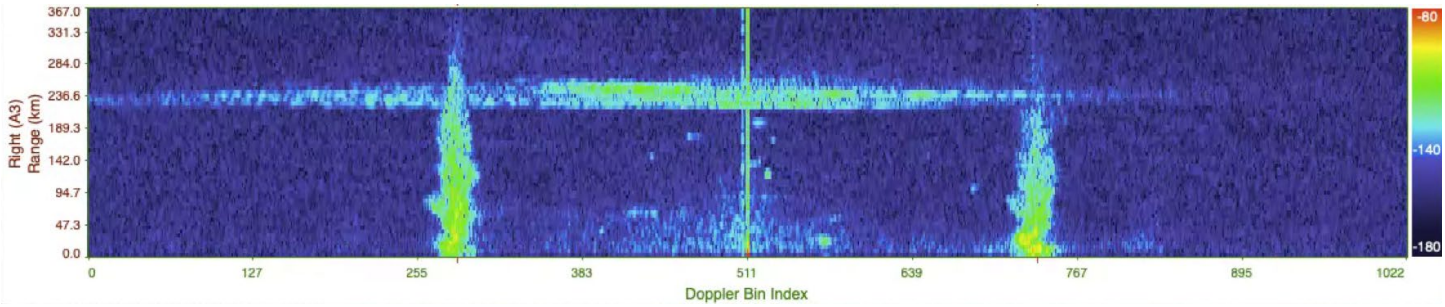


Photo: Range-Doppler spectra at the Block Island test site running with a sweep rate of 4 Hz and a Doppler FFT length of 4096. The top image shows the cross spectra before being cropped. The bottom image shows the spectra after being cropped by the cropping software.



Electromagnetic Field Impacts on American Eel Movement and Migration from Direct Current Cables

Many marine species use either magnetic fields for navigation or electric fields for finding prey. Offshore wind development requires cables to transmit electricity from the turbines to shore where it connects with local power grids. These cables may use either alternative current (AC) or direct current (DC) to transmit the electricity. Although the cables have shielding and are generally buried, electromagnetic fields (EMFs) are emitted from the cable. In general, AC cables transmit less electricity than DC cables and therefore the EMFs are less. This study examined the interactions between the American eel (Anguilla rostrata) with a DC cable, the Cross Sound Cable in Long Island Sound. The eel is known to use magnetic fields for migrating and migrates through the area of the Cross Sound Cable. The eels were tagged and tracked as they migrated past the cable. The EMF was measured using the Swedish Electromagnetic Field Low-Noise Apparatus.

Findings

- The eels responded to the DC cable electromagnetic field.
- The interaction did not result in a barrier to migration.

How BOEM will use this information

- Results will inform environmental assessments of future offshore wind development.
- Identify additional information needs particularly for cumulative impacts.

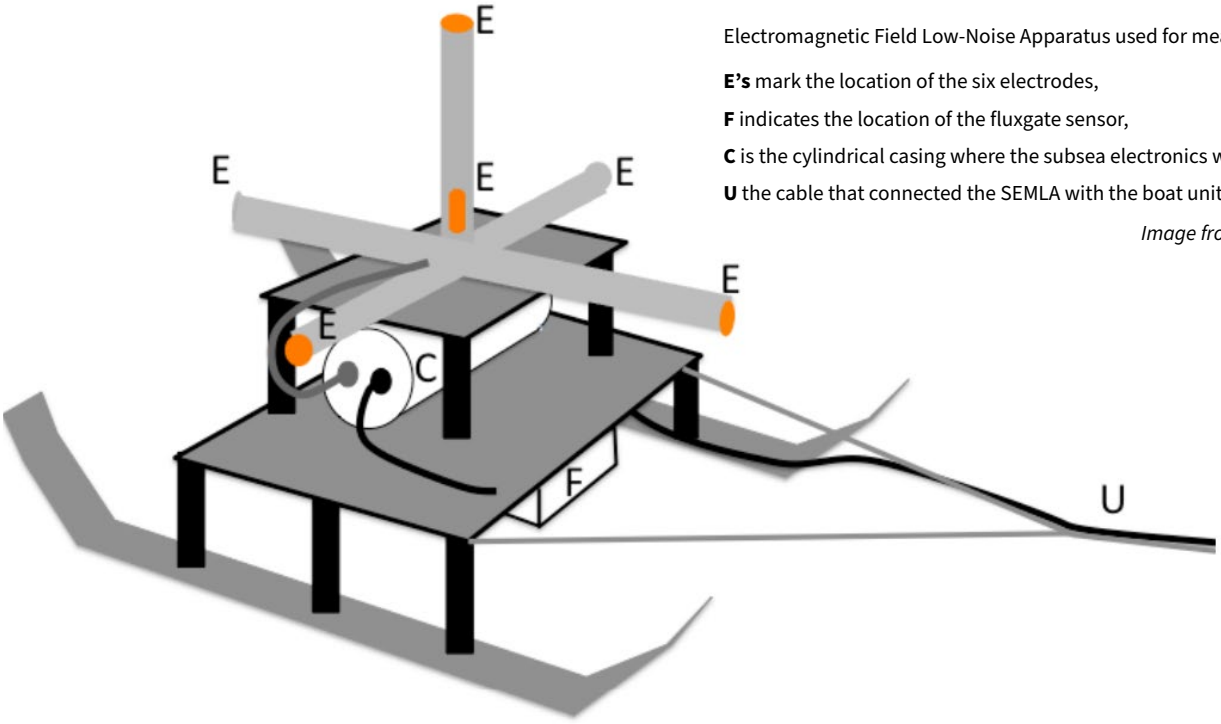
Additional information

Final report:
Electromagnetic Field Impacts on American Eel Movement and Migration from Direct Current Cables

Conducted by:
University of Rhode Island

Key Researchers:
Z. I. Hutchison, P. Sigray, A. B. Gill, T. Michelot, J. King

Funded by:
BOEM



Electromagnetic Field Low-Noise Apparatus used for measuring EMF from cables.

E's mark the location of the six electrodes,

F indicates the location of the fluxgate sensor,

C is the cylindrical casing where the subsea electronics were stored,

U the cable that connected the SEMLA with the boat unit.

Image from Hutchison et al., (2018)

Field Observations During Offshore Wind Structure Installation and Operation, Volume I

As part of the Real-Time Opportunity for Development Environmental Observations (RODEO) Study, underwater sound was measured during the installation of two wind turbines as part of the Coastal Virginia Offshore Wind (CVOW) project. Through coordination with the operator and NOAA, an experiment was conducted that allowed for the measurement of sound from one turbine while a bubble curtain was used for to reduce the sound, and from a turbine without the bubble curtain. Using a variety of instruments that were placed near the installation location and also a variety of techniques to make measurements up to 30 kilometers from the installation, an evaluation of the effectiveness of the bubble curtain was made.

Conducted by:
HDR

Key Researchers:
J. L. Amaral, K. Ampela, A. S. Frankel, A. A. Khan, Y.-T. Lin, T. Mason, J. H. Miller, A. E. Newhall, G. R. Potty

Funded by:
BOEM

Findings

- The bubble curtain reduced the sound (peak pressure) from 4.2 to 23.1 dB depending on the distance.
- The effectiveness of the noise reduction at CVOW was dependent on sound frequency.

How BOEM will use this information

- Results will inform environmental assessments of future offshore wind development.
- Provide information about the use of mitigation measures such as bubble curtains and their effectiveness.

Additional information

Final report:
Field Observations During Offshore Wind Structure Installation and Operation

Photo: Double bubble curtain around a monopile foundation during installation at CVOW.

Photo: Deploying instruments for acoustic measurements.

Floating Offshore Wind Turbine Development Assessment

Floating offshore wind turbines (FOWTs) are proposed for water depths greater than about 60 meters, which is common near shore along the Pacific, but also some locations on the Atlantic such as the Gulf of Maine. This assessment of FOWTs reviewed the current state of knowledge regarding technology and environmental considerations worldwide. It includes a comprehensive list of all current floating wind projects as well as ongoing research activities. The report assessed structural design and dynamic modeling, mooring and anchoring designs, dynamic power cable systems, fabrication and installation methods, fabrication facilities, and current modeling efforts. Three broad categories of environmental issues unique to FOWTs were identified focusing on potential US sites.

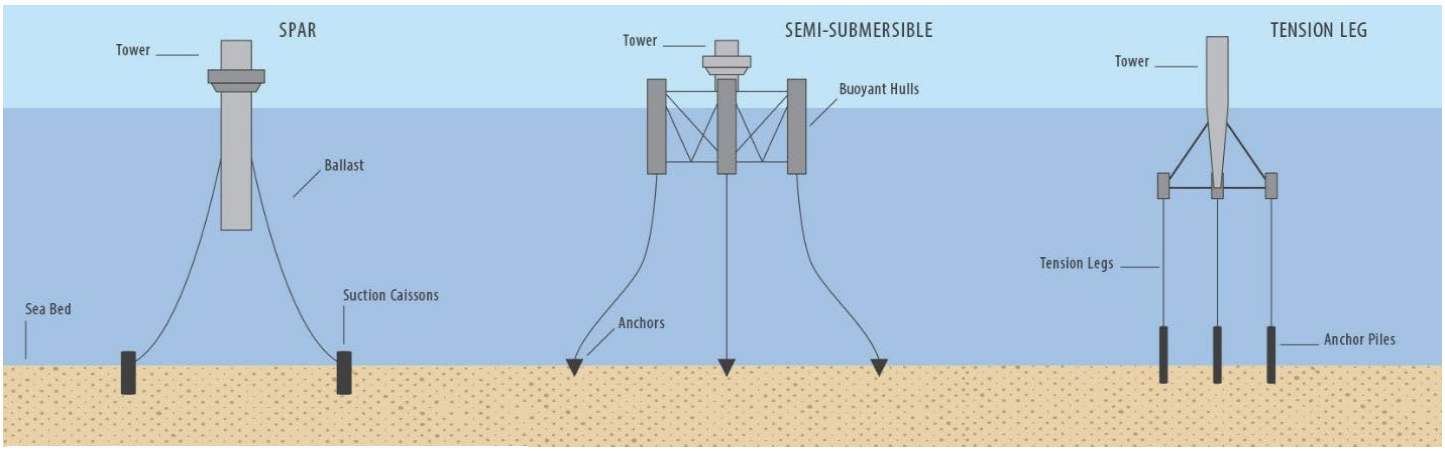


Photo: Examples of Floating Offshore Wind Turbine designs.

Conducted by:
ABSG Consulting Inc.

Key Researchers:
Louis Steinbrecher, David Stalfort, Lars Samuelsson, Xiaohong Chen, Susan Nourse

Funded by:
BOEM

Findings

- Loss of access to shipping grounds, negatively impacting both displaced fishers and the areas to which those fishers are displaced.
- Shipping/Navigational hazards, including the need to alter shipping routes to avoid the risk of collision/allision.
- Impacts of the FOWTs on pelagic life, namely entanglement, habitat displacement, spill risks, and noise impacts.

How BOEM will use this information

- Management of offshore wind energy leases.
- Environmental and technical review of proposed offshore wind facilities that utilize floating technology.

Additional information

Final report:
Floating Offshore Wind Turbine Development Assessment

Hydrodynamic Modeling, Particle Tracking and Agent-Based Modeling of Larvae in the U.S. Mid-Atlantic Bight

Offshore wind projects have the potential to alter local and regional physical oceanic processes, via their influence on currents from turbine foundations and by extracting energy from the wind. Hydrodynamic modeling (HDM), particle tracking modeling and Agent-Based Models (ABMs) were used to assess how the introduction of commercial scale offshore wind energy facilities in the Massachusetts-Rhode Island (MA-RI) marine areas may affect local and regional oceanic responses (e.g. currents, temperature stratification) and related larval transport under typical seasonal conditions. The HDM and ABM were developed, calibrated, and verified against a range of observed oceanographic and survey data to demonstrate that related conditions prior to offshore wind construction were well represented by the integrated model. Four build out scenarios and three focal species were selected for investigation.

Findings

- Structures do modify oceanic responses by the extraction of energy from the wind by the OSW turbines.
- Changes in currents lead to varying degrees of discernible increases and decreases in larval settlement density across scenarios.
- At a regional fisheries management level, these shifts are not considered overly relevant with regards to larval settlement.

How BOEM will use this information

- Improve assessments of the impacts of offshore wind development on larvae and sediment dispersion.
- Evaluation of cumulative impacts of multiple wind facilities on oceanic processes in the Massachusetts-Rhode Island lease areas.

Additional information

Final report:
Hydrodynamic Modeling, Particle Tracking and AgentBased 049 Modeling of Larvae in the U.S. MidAtlantic Bight

Conducted by:
DHI Water & Environment, Inc.

Key Researchers:
T. L. Johnson, J. J. van Berkel, L. O. Mortensen, M. A. Bell, I. Tiong, B. Hernandez, D. B. Snyder, F. Thomsen, O. S. Petersen

Funded by:
BOEM

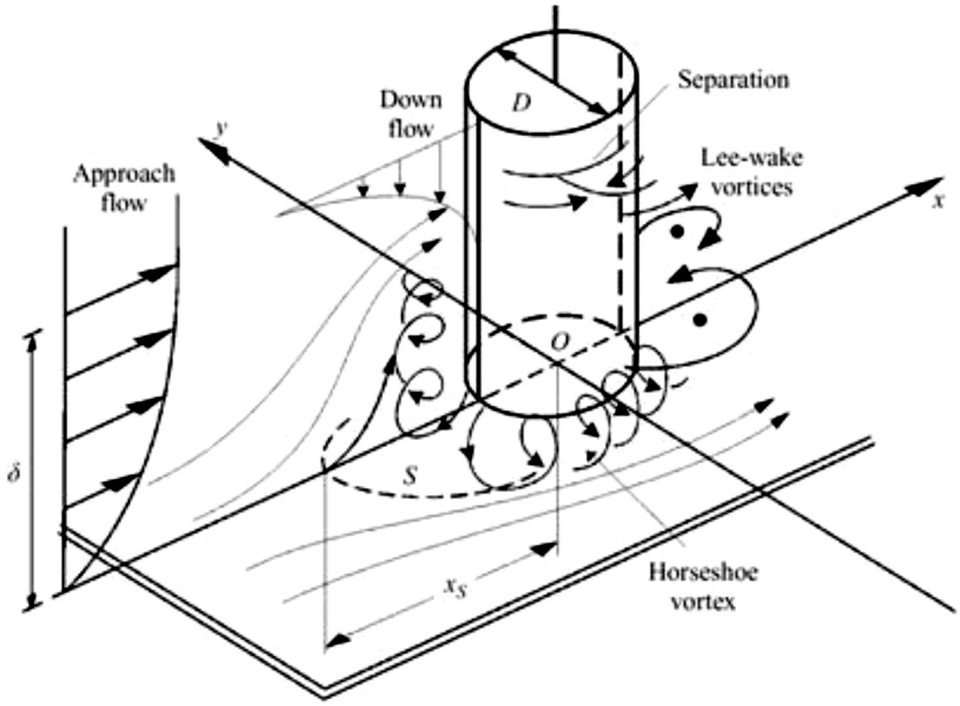
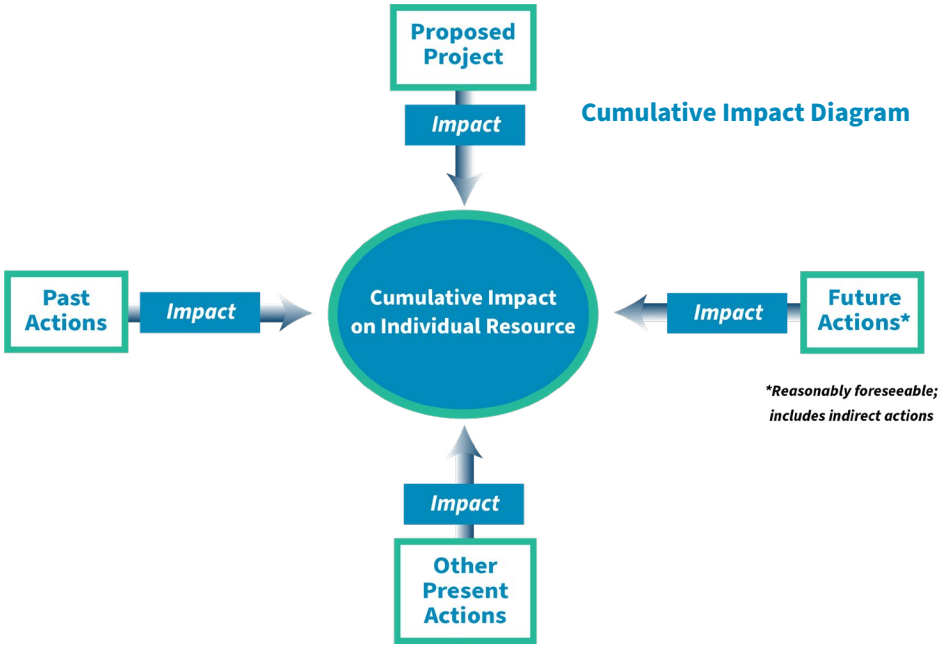


Photo: Sketch of large turbulent flow around the monopile structure.

National Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the South Atlantic Outer Continental Shelf

National Environmental Policy Act (NEPA) guidance for evaluating cumulative effects specifies the need to include all relevant past, present, and reasonably foreseeable future actions and to focus on truly meaningful effects. Agencies are charged with developing action- or activity-specific cumulative impacts scenarios in accordance with this general guidance. Considering expected growth in renewable energy projects offshore from North Carolina to Florida, the purpose of this document is to establish a common cumulative impacts scenario framework for use in NEPA analyses for offshore wind activities on the South Atlantic Outer Continental Shelf (OCS). This will enable efficient and effective identification of relevant actions for the cumulative effects analyses, and the development of consistent, succinct NEPA documents that demonstrate sound logic for cumulative effects findings.



Cumulative Impact Diagram

Findings

- Identifies the important cause-and-effect relationships between renewable energy projects and potentially affected resources.
- Identifies the types of actions and activities to include in the cumulative impacts scenario.
- Identifies past, present, and reasonably foreseeable actions and activities in the North Atlantic OCS to consider in future NEPA cumulative impact scenarios.
- Provides guidance on and information sources for identifying relevant past, present, and reasonably foreseeable actions for each action/activity.

How BOEM will use this information

- BOEM will use this scenario in environmental impact statements to ensure consistent assessment of impacts from offshore wind facilities.

Additional information:

Final report:
National Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the South Atlantic Outer Continental Shelf

Conducted by:
Avanti Corporation and Industrial Economics, Inc.

Key Researchers:
Avanti Team

Funded by:
BOEM

Atlantic Marine Assessment Program for Protected Species: FY15 - FY19

The Atlantic Marine Assessment Program for Protected Species (AMAPPS) is a comprehensive multiagency research program on the U.S. Atlantic outer continental shelf, from Maine to the Florida Keys, covering waters from the coast to beyond the U.S. Exclusive Economic Zone (EEZ). The overarching goal of AMAPPS is to assess the abundance, distribution, ecology, and behavior of marine mammals, sea turtles, and seabirds throughout the U.S. Atlantic outer continental shelf and to evaluate these data within an ecosystem context where the results are accessible to managers, scientists and the public. Because marine ecosystems are complex and involve dynamic assemblages of many coexisting species, to understand these marine ecosystem processes and achieve the AMAPPS objectives, our research integrates cross-taxonomic groups across multiple trophic levels and uses a suite of data collection and analytical techniques. Researchers conducted 31 projects that collected visual detections from aerial and shipboards surveys, passive acoustic detections, animal-borne tag locations, dive pattern data, and direct and indirect samples of the physical and biological oceanic ecosystem.

Conducted by: National Oceanic Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center and Southeast Fisheries Science Center

Key Researchers: D. Palka, L. Aichinger Dias, E. Broughton, S. Chavez-Rosales, D. Cholewiak, G. Davis, A. DeAngelis, L. Garrison, H. Haas, J. Hatch, K. Hyde, M. Jech, E. Josephson, L. Mueller-Brennan, C. Orphanides, N. Pegg, C. Sasso, D. Sigourney, M. Soldevilla, H. Walsh

Funded by:
BOEM, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Navy

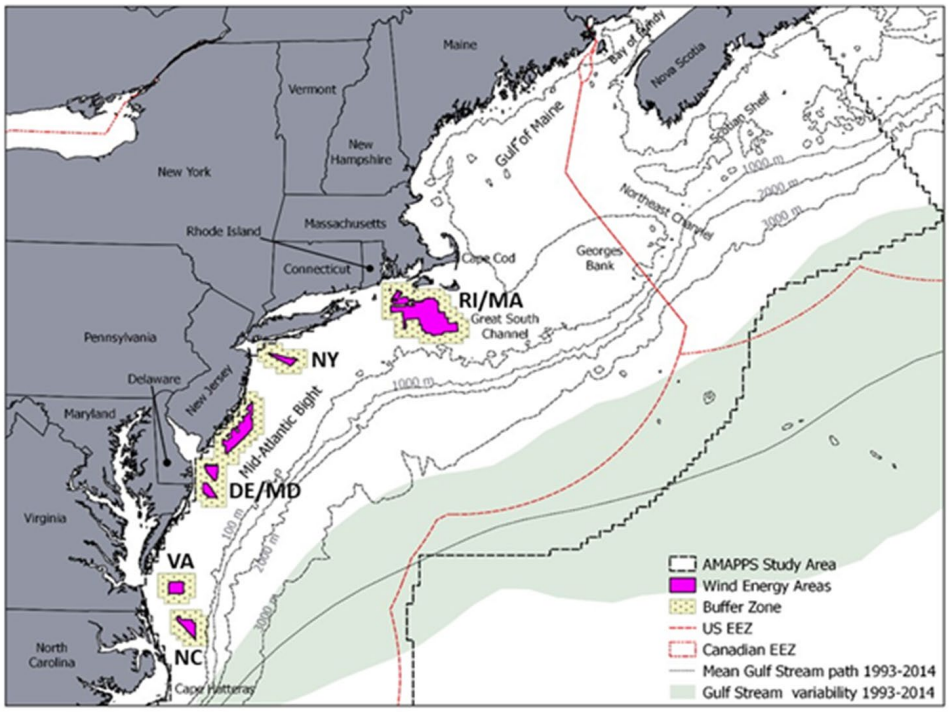


Photo: Northern portion of the AMAPPS study area.

Findings

- Expanded knowledge about the distribution, abundance, and habitat usage of protected species.
- Developing new techniques and models to estimate abundance trends.

How BOEM will use this information

- Preparation of environmental assessments of the impact of offshore wind development along the Atlantic.
- Development of mitigation measures to minimize impacts to protected species.

Additional information:

Program website:
fisheries.noaa.gov

Final report:
Atlantic Marine Assessment Program for Protected Species: FY15 – FY19

Ecological Baseline Studies of the US Outer Continental Shelf

Conducted by:
Normandeau Associates, Inc. and APEM, Inc.

Key Researchers:
J. Robinson Willmott, G. Forcey, M. Vukovich, S. McGovern, J. Clerc, J. Carter

Funded by:
BOEM

Baseline data of wildlife distribution and abundance is important to collect prior to offshore wind development. Data are used to identify natural trends and fluctuations in species' abundance and distribution, which helps interpret changes in wildlife patterns after any development. High-resolution (1.5 cm at the ocean's surface) aerial digital surveys were conducted over a two year period off the coasts of North and South Carolina in three wind energy areas —Wilmington East, Wilmington West, and Kitty Hawk—plus the Grand Strand Call Area. Eight high-resolution aerial digital surveys were conducted in February 2018 & 2020, May/June 2018, May 2019, October 2018, September 2019, and December 2018 & 2019. Images from each survey were reviewed using a combination of automated and manual processes with identification to the lowest taxonomic level possible. Abundance data were corrected for the differences in level of effort among surveys providing densities by km2. This allowed meaningful comparisons among seasons when survey effort was different.

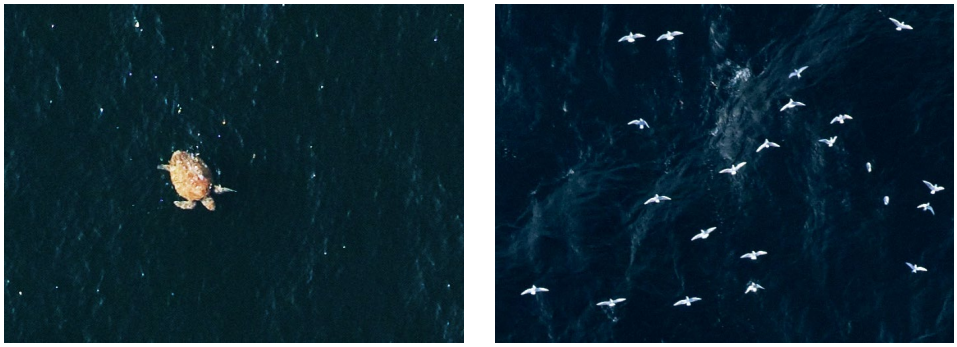


Photo: Aerial digital survey of loggerhead sea turtle and bonaparte's gulls

Findings

- A total of 185,983 animals were identified by taxonomic experts including 148,074 birds, 4,191 marine mammals, 3,049 turtles, 3,034 sharks, 23,380 rays, and 4,255 large bony fishes. Some highlights:
  - 64 species birds, most common groups: phalaropes (25%), gulls (24%), and loons (17%).
  - Four species of turtles.
  - 99% of all marine mammals were dolphins.
  - 93% of all rays were cownose rays.
  - Of the 60% of fish (n=2,556) that were ascribed to species, mahi-mahi was the most abundant (n=1,803).
- Bird densities were the greatest during the winter months (December & February) and lowest in the late spring and early summer months. Turtle density decreased in the northern parts for the survey during winter and increased during the warmer months.

How BOEM will use this information

- Evaluate impacts for potential offshore wind development prior to leasing.
- Inform environmental assessments of impacts from offshore wind facilities.

Additional information:

Final report: Ecological Baseline Studies of the US Outer Continental Shelf
Project website: Remote Marine and Onshore Technology
Data: Ecological Baseline Studies of the U.S. OCS Option Year 1 & Ecological Baseline Studies of the U.S. OCS Option Year 2

Megafauna Aerial Surveys in the Wind Energy Areas of Massachusetts and Rhode Island with Emphasis on Large Whales

Beginning in October 2011, the Massachusetts Clean Energy Center funded aerial surveys of the Massachusetts wind energy area. BOEM joined this effort in 2012 and extended the surveys to include the Rhode Island Massachusetts area. Monthly surveys have continued with these two reports, Campaign 5 covering October 2018 to August 2019 and Campaign 6A from March to October 2020. The surveys use a combination of observers and cameras to collect information about the distribution and abundance of whales, dolphins, and sea turtles. Sampling for temperature, salinity, and zooplankton was conducted to address ecological questions.

Findings

- The study area includes seasonal aggregations of protected species of whales and sea turtles.
- Early surveys (2011-2015) showed that North Atlantic right whales (Eubalaena glacialis), a critically endangered species, occurred in the study area during winter and spring; more recent surveys (2017-2020) show that right whales occur in the study area in all seasons.

How BOEM will use this information

- Inform environmental assessments of construction and operations plans for offshore wind.

Additional information:

Surveys in 2018-2019: Megafauna Aerial Surveys in the Wind Energy Areas of Massachusetts and Rhode Island with Emphasis on Large Whales: Summary Report

Surveys in 2020: Megafuna Aerial Surveys in the Wind Energy Areas of Massachusetts and Rhode Island with Emphasis on Large Whales: Interim Report

Conducted by:
New England Aquarium

Key Researchers:
O. O'Brien, K. McKenna, D. Pendleton, J. Redfern

Funded by:
BOEM and Massachusetts Clean Energy Center

Photo: Humpback whales observed bubble-net feeding on June 4, 2020

Optimization of Towed Passive Acoustic Monitoring (PAM) Array Design and Performance Study (Passive Acoustic Monitoring Study)

A numerical model for simulating the localization performance of a three- or four-hydrophone towed passive acoustic monitoring (PAM) array on multiple species clusters was developed. The model will allow BOEM to assess the ability of towed PAM arrays to determine the position of vocalizing marine species. The ability to localize a marine mammal call using PAM systems commonly deployed for mitigation surveys requires several conditions and assumptions. In order to localize, the call must first be detected. A detection's range will be dictated by the received amplitude of the signal, which in turn depends on the species, distance, and relative orientation to the receiver, as well as the noise conditions of the monitoring environment. The goal of this project is to develop an algorithm and user interface to input proposed array specifications and determine the theoretical localization capability for low-, mid-, and high-frequency cetaceans within 5 km of the array.

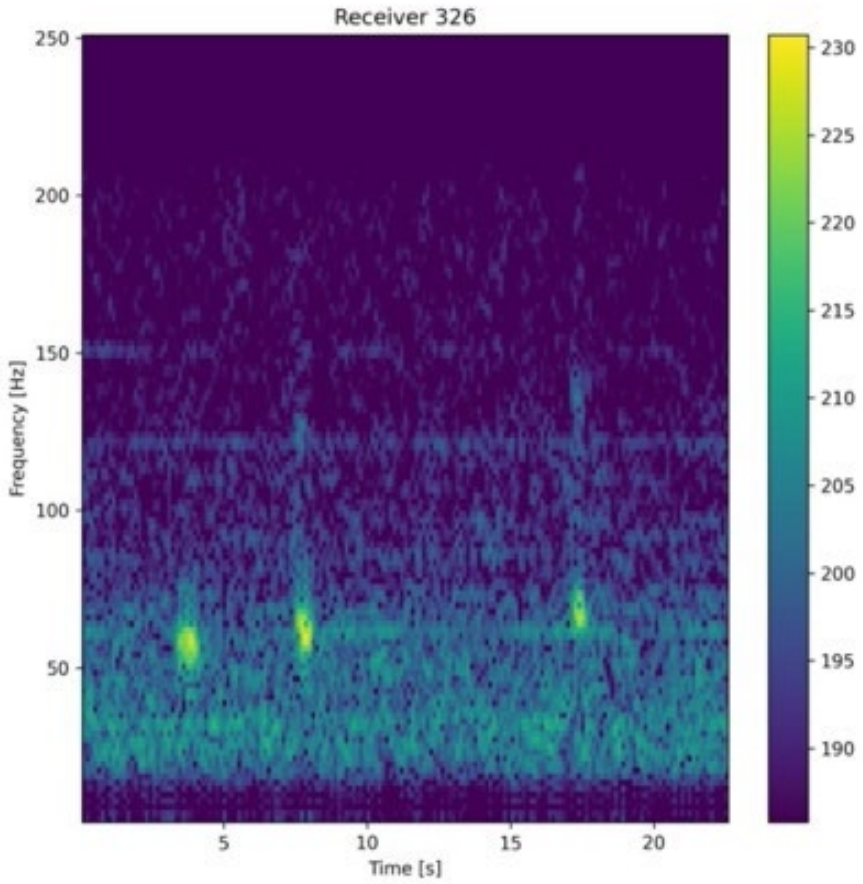


Photo: Spectrogram of three baleen whale vocalizations used for testing the algorithm developed for this project

Findings

- A software package and user manual available for use to evaluate proposed PAM systems.
- The uncertainty in range estimation is dominated by the uncertainty in array element position.

How BOEM will use this information

- To assess the localization efficacy of towed PAM arrays proposed in mitigation and monitoring plans.

Additional information:

Final report:
Optimization of Towed Passive Acoustic Monitoring (PAM) Array Design and Performance Study (Passive Acoustic Monitoring Study)

Conducted by:
CSA Ocean Sciences Inc.

Key Researchers:
A. Thode, S. Abadie, M.J. Barkaszi

Funded by:
BOEM

Risk Assessment to Model Encounter Rates between Large Whales and Vessel Traffic from Offshore Wind Energy on the Atlantic OCS

Vessel strikes during the planning for and construction of offshore wind facilities are evaluated in support of environmental assessments by BOEM. This study developed a model and calculator to estimate the potential strikes in wind lease areas along the Atlantic coast. Vessel strikes happen when encounters between a vessel and an animal occur and the animal or vessel fails to detect one another in time to react and avoid a collision. Variables that contribute to the likelihood of a strike include vessel speed, vessel size and type, the species behavior, and barriers to vessel detection by an animal (e.g., acoustic masking, heavy traffic, biologically focused activity). In some cases, mitigation measures such as the use of lookouts and time/area speed restrictions may be in place to reduce the risk associated with the vessel operation.

Findings

- A model to estimate vessel strikes in wind leases along the Atlantic including a calculator and user manual.
- Additional interpretation and analysis may be required to quantify the effectiveness of mitigation intended to avert or reduce that risk.

How BOEM will use this information

- Improve assessment and visualization of vessel strike risk across wind energy areas on the Atlantic coast.
- Support analyses in environmental assessments.

Additional information:

Final report:
Risk Assessment to Model Encounter Rates Between Large Whales and Sea Turtles and Vessel Traffic from Offshore Wind Energy on the Atlantic OCS

Conducted by:
CSA Ocean Sciences Inc.

Key Researchers:
M.J. Barkaszi, M. Fonseca, T. Foster, A. Malhotra, K. Olsen

Funded by:
BOEM

Photo: Whale tail in front of vessel and wind farm.

Improving Monitoring, Data Consistency, Archiving, and Access for Improved Regional Integration of Renewable Energy Science

The Bureau of Ocean Energy Management convened two workshops in 2021 bringing together subject matter experts and other invited stakeholders to develop wildlife data standards. The meetings were planned in coordination with the Regional Wildlife Science Collaborative (RWSC) to improve regional collaboration and science conducted for offshore wind. The workshop on passive acoustic monitoring (or PAM) of marine mammals was planned in coordination with the National Oceanic and Atmospheric Administration. The workshop on satellite tracking of birds in the offshore marine environment was planned in coordination with the U.S. Fish and Wildlife Service. The workshops discussed key data standard topics with stakeholders including data collections methods; metadata requirements, storage, archival and maintenance; and data products. The workshop reports discuss stakeholder perspectives and key outcomes from each of the workshops.

Conducted by:
Consensus Building Institute

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Funded by:
BOEM

Findings

- Participants reviewed and agreed to a proposed regional monitoring design.
- For avian species, while the discussion uncovered the need for new tools and systems, most participants advocated for the use of existing tools and systems to expedite the use of standardized workflows.

How BOEM will use this information

- Work towards implementing a regional monitoring design for PAM.
- Continue to support existing tools and systems in place for the collection of avian data.

Additional information:

Final report:
Workshop Summary on Passive Acoustic Monitoring and Marine Mammals June 2-3, 2021

Workshop Summary on Avian Telemetry June 29-30, 2021

Workshop Summary on Passive Acoustic Monitoring and Marine Mammals June 2-3, 2021

Workshop Summary on Avian Telemetry June 29-30, 2021

What's Next

Here are a few of the new and continuing studies that are underway:

Marine bird distributions may shift within leases of different durations due to **regional changes in oceanographic conditions** and could make certain species more vulnerable to energy-related activities. Working with NOAA, National Centers for Coastal Ocean Science, this study is using the Northwest Atlantic Seabird Catalog to evaluate species shifts.

[Expected completion: 2022]

Impact of noise during construction of offshore wind projects on commercially important fish is a concern all along the Atlantic coast. This study will examine **behavioral effects of sound sources** from offshore renewable energy construction on the black sea bass (Centropristis striata) and longfin inshore squid (Doryteuthis pealeii).

[Expected completion: 2022]

The **North Atlantic right whale** is a critically endangered species whose range extends from Canada to the coast off Georgia. One stressor is food availability, especially in the Gulf of Maine. This study supports monitoring of a primary food source for the whales, Calanus finmarchicus. BOEM will use the results when evaluating the cumulative impacts to NARW.

[Expected completion: 2022]