

## **Environmental Studies Program: Ongoing Studies**

**Study Area(s):** North, Mid-Atlantic

**Administered By:** Office of Renewable Energy Programs

**Title:** A Parametric Analysis and Sensitivity Study of the Acoustic Propagation for Renewable Energy Sources and Projects

**BOEM Information Need(s) to be Addressed:** BOEM Office of Renewable Energy is required by the Endangered Species Act, Marine Mammal Protection Act, and the National Environmental Policy Act to assess the potential for impact for all of its projects. These assessments typically address the acoustic energy produced during the requisite activities for the construction and operation of these projects including: High Resolution Geophysical (HRG) surveys, construction noise, support vessel noise and operational noise. To date, these projects and analyses have been spread out in time and location and handled individually. However, as the number of projects increases, there is an increasing need to consistently and thoroughly manage the overall acoustic modeling effort. A prerequisite to managing this modeling is a clear understanding of the variability of the model's critical input parameters and how they constrain and drive the acoustic model results. This study will quantify those parameters and the modeling results they help to produce.

**Total Cost:** \$334,693

**Period of Performance:** FY 2017-2019

**Conducting Organization(s):** CSA Ocean Sciences Inc.

**Principal Investigator(s):** Michele Halvorsen, MHalvorsen@conshelf.com

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### **Description:**

**Background:** Many renewable energy projects consist of component activities that have common noise sources and occur in similar environmental conditions. Some of these commonalities include: 1) a limited number of sources many (e.g., pile driving for either a meteorological tower, wind turbine, or servicing platform)), 2) limited ranges of the source level (SL) and frequencies, 3) activities typically occur on the continental shelf, in similar types of shallow water areas (e.g., in water <50 m deep) with similar propagation modes, 4) activities occur in areas with similar bottom types (e.g., typically sand, gravel, rock areas) with relatively strong acoustic reflection characteristics, and 5) activities may require similar oceanographic conditions (e.g., low sea states or wind speeds) in order to complete the activity. This study will focus on sound generated by pile driving and evaluation of the models used to estimate the sound field.

The similarities of the sources employed during renewable activities, the environmental and acoustic characteristics of the areas where these source operate and the operational characteristics of the activities (e.g., duration of operations, depth of water in the operations area, etc.) indicate that the range of potential acoustic propagation fields and levels may be amenable to parametric analysis and characterization. By identifying and applying constraints to these parameters, modeling efforts will become more efficient for both industry and the government by standardizing the approaches to modeling and focusing attention only on those variables that could lead to adjustments in mitigation. Additionally, at the very least, this study should be able to quantify the ranges of the important parameters and provide an assessment of the sensitivity of the acoustic modeling output to these parameters.

**Objectives:** The objective of this study is to standardize modeling for sound propagation from activities associated with offshore renewable energy development with a focus on pile driving.

**Methods:** The study will be conducted in two phases. Phase one will conduct a technical analysis of the acoustic propagation and modeling on the Atlantic continental shelf in order to provide: 1) recommendations for a consistently underwater acoustic modeling approach across the numerous renewable energy projects including the recommendation of models, databases and methodologies, to cover pile driving 2) a baseline of expected range of expected modeling results including impact volumes around “typical” sources, 3) identify a baseline variability for the expected acoustic modeling results based on the variability of the critically modeled parameters, 4) results which can serve as a sensitivity study for inclusion in future compliance documents, and 5) identify sources or systems involved with renewable activities which have negligible potential for environmental impact. Phase two will use data collected from European wind facility construction where monopoles were used.

**Current Status:** The kick-off meeting was held in January 2017. The datasets for model validation were selected in March 2017. Modeling using those datasets is underway.

**Final Report Due:** December 2018

**Publications Completed:** None.

**Affiliated WWW Sites:** None.

**Revised Date:** January 12, 2018