

Environmental Studies Program: Ongoing Study

Study Area(s): Southern California, Northern California, Washington-Oregon

Administered By: Pacific OCS Region

Title: Cross-shelf Habitat Suitability Modeling (NSL #PC-15-07)

BOEM Information Need(s) to be Addressed: The wave and wind climates along the West Coast of North America represent one of the best prospects for the development of offshore renewable energy, yet assessments of the potential ecological effects of renewable energy on benthic habitats have only just begun. The siting of renewable energy facilities on the OCS adjacent to California, Oregon, and Washington requires a knowledge base that can be applied over a regional scale. While it is costly to undertake a region-wide study, improvement of existing habitat suitability models will provide a tool BOEM can use to extrapolate data from one area across to areas where less is known. Improved models have the potential to inform regional spatial planning processes for future consideration of renewable energy facilities and the necessary consultations associated with leasing (e.g., on Essential Fish Habitat [EFH]). Improved habitat suitability modeling could also improve site assessments needed for NEPA analysis and may reduce site survey requirements for lease holders. This work would help to standardize modeling efforts among different OCS Regions.

Total BOEM Cost: \$490,000

Period of Performance: FY 2016–2019

Conducting Organization(s): National Oceanic and Atmospheric Administration and Oregon State University

Principal Investigator(s): [John Christensen](#) (NOAA) and [Dr. Sarah Henkel](#) (OSU)

BOEM Contact(s): [Lisa Gilbane](#)

Description:

Background: The BOEM/Oregon State University (OSU) study, *Survey of Benthic Communities near Potential Renewable Energy Sites Offshore the Pacific Northwest*, developed a habitat suitability model for selected infaunal species and glass sponges. The model identifies a number of habitat covariates that relate to specific invertebrate communities and use those relationships to predict other locations where those communities are likely to be found. Therefore, the model is a tool to identify the key physical parameters that are more cost effective to sample than biological sampling.

BOEM, NOAA (which conducts EFH consultations), and other regional stakeholders use modeling to incorporate regional data to inform decisionmaking. Evaluating and improving the spatial extent and validating the BOEM/OSU habitat suitability model is necessary before it can be a useful tool. Currently, this model is limited to the inner and mid-shelf depths, but it is now clear that renewable energy developers are interested in areas farther offshore. By expanding the geographic scope, a cross-shelf sampling will

provide a high-resolution understanding of cross-shelf dynamics. Such an understanding will improve the predictive capabilities of this model.

Models are only useful if they are accurate and used appropriately. The BOEM/OSU habitat suitability model was validated using portions of one infaunal dataset. An impartial analysis of the model using a completely separate dataset is needed to validate the accuracy and usefulness of the model. BOEM has previously funded efforts to model habitat associations of birds and mammals using different methods. Separate models also exist for fishes and invertebrates. BOEM needs to have a clearer understanding of the strengths and weaknesses of these different modeling approaches in order to ensure that the outputs are directly useful to non-modeling experts within BOEM.

Objectives: To improve the predictive capabilities of habitat suitability models available for the continental shelf and slope off California, Oregon, and southern Washington by:

- Improving applicability of the invertebrate soft sediment model to a wider depth range;
- Creating a presence absence model for sponges and corals; and
- Providing a comparison among alternative modeling approaches.

Methods: Direct sampling is required to improve and validate existing models. Box core sampling focused on unconsolidated sediments; samples were collected in the summer of 2017 and species were sorted, identified, and counted. Available data from other sources are being inventoried and compiled. Model pathways will be evaluated. Models will be output as GIS-based raster images.

This project intends to utilize NOAA's expertise to evaluate the BOEM/OSU habitat suitability model and compare it to similar modeling approaches developed with other biological datasets. Potential examples could include existing models used for predicting Pacific groundfish fisheries or coral habitat. The BOEM/OSU habitat suitability model is based on a Bayesian network and GIS framework that is designed to be updated with new information. Novel model frameworks developed by NOAA will be similar and compatible with habitat suitability models developed for BOEM in the Atlantic and Gulf of Mexico Regions.

Current Status: The BOEM-NOAA interagency agreement was awarded in September 2016 and the BOEM-OSU cooperative agreement was awarded in June 2016. Environmental and biological datasets have been acquired and preliminary models are in process.

Final Report Due: August 30, 2019

Publications Completed: None

Affiliated WWW Sites: <https://marinecadastre.gov/epis/#/search/study/100171>

Revised Date: July 13, 2018