BOEM Pacific OCS Region: Ongoing Study

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

Administered By: Pacific OCS Region

Title: Visual Simulation of Whales and Renewable Energy Moorings and Cables (Study #PR-17-WHL)

BOEM Information Need(s) to be Addressed: BOEM is charged with the responsibility of granting a lease, easement, or right-of-way for renewable energy development on the OCS. In the Pacific OCS Region where the continental shelf is steep, floating wind energy structures are more feasible for development than fixed-bottom structures. Floating wind energy structures would need to be anchored to the seabed via multiple mooring lines and connected via electrical cables. To inform its leasing and management decisions in the Pacific OCS Region, BOEM has a critical need to obtain information about the potential effects of underwater mooring lines and electrical cables from floating wind energy development on whales.

Total BOEM Cost: $90,010 **Period of Performance:** FY 2017–2019

Conducting Organization(s): U.S. Department of Energy, Pacific Northwest National Laboratory (PNNL)

Principal Investigator(s): Dr. Andrea Copping

BOEM Contact(s): Greg Sanders and Sara Guiltinan

Description:

Background: Anchoring floating wind platforms to the seabed will entail the passage of multiple mooring lines and electrical cables through the water column, from near the sea surface to the sea floor. Concerns have been raised that large whales may collide with and/or become entangled in lines and cables from an offshore wind array, causing injury or death. In the absence of real-world data on whale encounters with the types of mooring lines and cables expected in floating wind installations (existing data on entanglements with fishing gear do not provide a completely appropriate analogue), modeled simulations of a whale traversing a floating wind array will help to illuminate the encounter risk from a whale's point of view.

Objectives: Create appropriate visuals that demonstrate the scale of the mooring lines and electrical cables of a floating offshore wind energy array as compared to a whale traveling through the array, and characterize the risk of large whales encountering the mooring lines and electrical cables.

Methods: Under the working assumption that a large whale is unable to sense and evade mooring lines and cables, PNNL will model a humpback whale and calf pair traveling through a hypothetical floating wind array. This approach may represent a

worst case encounter rate scenario as it will not account for potential avoidance responses whales may use. The dimensions and behavior of a humpback whale pair will be used for analysis because this species is present in the Pacific Region and is perceived to be more vulnerable to entanglement and collision hazards. Specific tasks include:

1. *Literature Survey and Data Gathering:* Available literature and relevant studies on the size and swimming behavior of humpback whales (e.g., dive depths, swimming speed, foraging vs. traveling behavior) and other inputs relevant to whale interactions with offshore wind platforms will be accumulated. A high level analysis will be carried out in order to develop scenarios that simulate a whale pair swimming through an array.

2. *Animated Whale Pair Swimming through Array:* Based on the scenarios from Task 1, an animated video will be developed of a humpback whale and calf pair traversing an array of floating wind turbines to demonstrate the scale of the animals, the distance between mooring lines and cables, and the size of the lines.

Current Status: Interagency agreement (IA) with PNNL was awarded September 18, 2017. The literature survey, data gathering, and scenario development component of this study is complete, draft animations have been reviewed, and the final animation work is underway.

Final Report Due: November 2018

Publications Completed: None

Affiliated WWW Sites: None

Revised Date: July 13, 2018