Evaluation of Multi-frequency Acoustic Surveys for Monitoring Regional Offshore Wind Areas

ASA ANALYSIS & COMMUNICATION, INC Environmental Science & Engineering [1]

NOAA FISHERIES Northeast Fisheries Science Center [2]

NORTEK [3]

Christopher Gurshin[1], George Cutter, Michael Jech[2], David Velasco[3]

PROJECT OVERVIEW

This project will use existing acoustic data collected by an uncrewed surface vehicle (USV) to develop large-scale, fishery-independent surveys and methods to monitor potential offshore wind impacts. Different sea animals reflect sound differently based on their size, shape, and body makeup (e.g., with and without gas-filled swim bladders) and these sound differences can help identify their classification. This project will test different survey designs to find the most effective one.

The DriX H-8 uncrewed surface vessel leaving port to the survey area.

Echograms collected while conducting spiral patterns around the southernmost turbine in the Block Island Wind Farm in October 2023.

HOW THE STUDY WORKS

- **Processes Existing Sonar Data:** Apply Calibration settings, generate metadata, remove noise, and synchronize data sets

- **Classify Volume Backscatter**: Use this common currency for quantitative comparisons among fish and plankton

- **Provide insight where fish and plankton are found**: Study how this is related to turbine locations and other abiotic factors

- **Evaluate Survey Designs**: Statistically compare survey designs
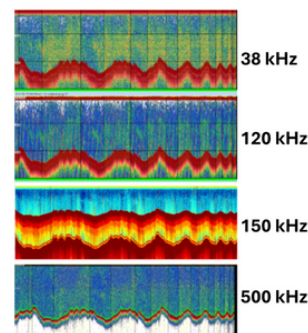
EXPECTED IMPACT

- Develop a processing framework for data integration from various sources.

- Evaluate ecologically important spatial scales with recommendations on how to use sound data effectively.

- Evaluate what factors may affect how strong sonar signals are near wind turbines.

WHY THIS MATTERS

- Offshore wind developers are required to implement **fisheries monitoring plans**, including **pre-construction**, **construction**, and **post-construction** fishery resource surveys.

- Monitoring potential impacts is typically carried out by **trawls, traps,** and **baited cameras**, which are **labor-intensive** and have **many limitations**.

- **Uncrewed platforms** with **acoustic sensors** would **overcome many challenges** and **limitations** of traditional sampling gear.

PROJECT GOALS

- Combine acoustic data from multiple sources to show where fish are in certain areas.

- Classify groups of fish and zooplankton based on how they reflect sound at different frequencies.

- Describe spatial distributions of fish and plankton relative to the offshore wind structure and activities.

- Evaluate different survey designs

ROSA Regional Research & Monitoring