Disentangling Environmental Variability and Offshore Wind Activity on Fish Presence

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PROJECT OVERVIEW

This project focuses on how **offshore wind development** in the **Massachusetts/Rhode Island area** affects **highly migratory pelagic fishes (HMS).** The team will develop a spatially explicit **species distribution model (SDM)** framework to better understand how wind farm construction and operation affect where HMS are found. The tool will also test whether forage species presence, derived from **environmental DNA (eDNA),** is helpful for predicting HMS movement.

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Goals

- Create a **SDM framework** that provides a comprehensive **assessment of impacts** of offshore wind phases on HMS.
- Provide insights on the **utility of eDNA-based prey data.**
- Develop **recommendations** for the **temporal sampling frequency** for offshore eDNA metabarcoding monitoring.

Outcomes

- This research will build on existing **offshore wind monitoring efforts** and help disentangle the influence of environmental variability and offshore wind activity on pelagic fish presence in offshore wind lease areas
- Results will inform the design of more effective acoustic telemetry and eDNA monitoring efforts.

How the study works

- This project will use existing and to-be-collected **acoustic telemetry, eDNA**, and **oceanographic data to predict where bluefin tuna, shortfin mako, and blue shark occur within the wind energy areas.**

- **SDMs** linking HMS occurrence to environmental conditions and the arrangement of the wind energy areas will **track shifts in HMS presence** across development phases and and **disentangle whether changes stem from environmental drivers or wind farm activity.**

- This project will **evaluate** whether models that use **only HMS data** predict species distributions as effectively as models that also **integrate prey availability** derived from vertebrate **eDNA metabarcoding.**

Why this matters

- Southern New England hosts a large and **valuable recreational fishery** for HMS that **overlaps** with **offshore wind lease areas.**
- **Acoustic telemetry** and **eDNA** are being used in **monitoring framework**s across multiple offshore wind lease areas.
- We currently **lack** the **tools needed** to **combine** these **important data sources** and **measure impacts accurately.**
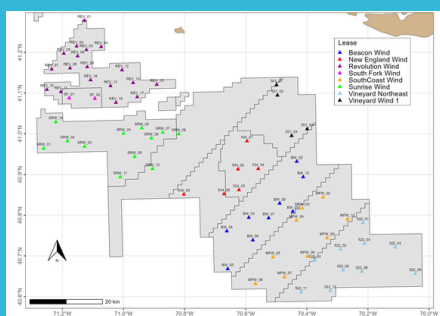
Acoustic Receiver Array used to monitor HMS presence in each lease area.
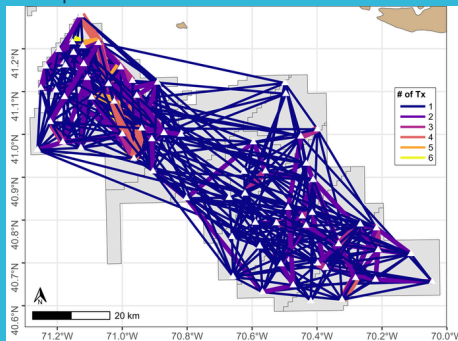
Bluefin tuna movement in Southern New England Wind Energy Area

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