ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDY

Title	Linking multiple data sources to better describe fishing vessel activity on the Atlantic OCS (AT 20-02)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	David Bigger (David.bigger@boem.gov)
Procurement Type(s)	Inter-agency agreement
Conducting Organization(s)	NOAA, National Centers for Coastal Ocean Science, Biogeography Branch
Total BOEM Cost	$250,000
Performance Period	FY 2021–2024
Final Report Due	June, 2023
Date Revised	September 17, 2021
PICOC Summary	Write **1-2 sentences** for each of the following elements, as appropriate.
Problem	Fishing activity within areas planned for renewable energy development is underestimated.
Intervention	Link the time and location Automatic Identification System (AIS) and Vessel Monitoring Systems (VMS) tracking data to observations of commercial fishing vessels from concurrent scientific wildlife and whale surveys to estimate the proportion of vessels not tracked.
Comparison	Activity based on AIS and VMS track lines vs. activity from wildlife surveys.
Outcome	A correction factor that could be used to adjust annual estimates of activity by fishery within lease areas, Wind Energy Areas (WEAs), and call areas.
Context	Atlantic OCS

BOEM Information Need(s): BOEM is responsible for the approval of a construction and operations plan (COP) submitted by developers for wind facilities on the Outer Continental Shelf (OCS). Describing fishing activity in areas identified for wind development is a high priority. The results from this study will inform and reduce uncertainty in economic impact assessments of offshore energy development to commercial fisheries under the National Environmental Policy Act and Coastal Zone Management Act. Although this is developed in the context for renewable energy, it also applies to oil and gas energy development.

Background: Assessments regularly use Automatic Identification System (AIS) and Vessel Monitoring Systems (VMS) data to describe fishing activity. Yet, fishing activity within areas planned for energy development is underestimated because not all commercial fishing vessels (particularly small vessels <65 feet) are outfitted with AIS or VMS transponders, and some vessel operators turn off their transponders. Although integrating data from these different tracking devices has led to significant improvements to assessments (e.g., Russo et al., 2016), linking data from sources independent of tracking data may also yield a clearer picture of fishing activity on the Atlantic OCS. Once linked, the magnitude of the underestimate can be quantified, and then a correction factor could be applied to adjust estimates of fishing activity.

Wildlife surveys conducted on the OCS often contain detailed records of fishing vessels. This is because many wildlife species are associated with fishing activity; observers often record the date, time and location, and activities of the fishing vessels. The time and location information from the wildlife surveys and AIS/VMS track lines can be used to link the two data sources together to find out whether the boats that are seen by wildlife observers are transmitting their position. If an observed boat was transmitting its position, then it would be in the AIS/VMS data. However, if an observed boat was not transmitting its position then there will be no record of it in the AIS/VMS data. The primary metric of interest is the proportion of observed boats that are not transmitting. If hypothetically 20% of the observed fishing vessels are not transmitting, then we could say that fishing activity is underestimated by 20% when it is based solely on AIS/VMS data.

Objectives: Explore how observations of fishing vessels from wildlife surveys can enhance the characterization of fishing vessel activity derived from AIS/VMS data. Link existing fishing vessel tracking data to observations of fishing vessels from concurrent scientific wildlife and whale surveys. Develop a method to estimate fishing effort (adjusted for vessels not tracked by AIS/VMS) by fishery, year, and season within lease areas, WEAs, call areas, regions, and other appropriate spatial or temporal scales.

Methods: The existing AIS and VMS data on the Atlantic will be integrated (see Russo et al., 2016). Next, each geo-spatial referenced vessel observation from a wildlife survey will be compared with AIS/VMS tracking data for the same time interval and general location. Each vessel observation will be assigned to one of two categories: 1) vessel transmitting or not transmitting its position; thus, linking the datasets. Once linked, the proportion of observed vessels using or not using AIS/VMS can be easily calculated by fishery across multiple spatial and temporal scales.

There are multiple datasets that are readily available with years of temporally and geo-spatially referenced observations of fishing vessels. For example, the BOEM funded Northwest Atlantic Seabird Catalog has nearly two thousand records of fishing vessels throughout the Atlantic. Additional data sources include the New York State Energy Research Development Authority's (NYSERDA) high-resolution imagery from seasonal wildlife surveys in the NY Bight, the BOEM-funded high-resolution imagery from seasonal baseline surveys in the south Atlantic, and high-resolution imagery from developers. Another rich source of data are Massachusetts Clean Energy Center's (MASSCEC) seasonal whale surveys that have 659 records of fishing vessels from 2012 to 2015 (Krause et al., 2016). In addition, BOEM will work with the North Atlantic Right Whale Consortium to obtain data from their databases and offshore wind developers to obtain observations of fishing vessel activity from their wildlife surveys. The information from the databases will be combined for analyses and would be made available for future analyses.

Given that wildlife survey data includes observational information that directly describes vessel activity (e.g., fishing, transiting, etc..). This observational information could also be used to validate and assess the accuracy of vessel activities derived AIS/VMS data. This validation could then be used to refine how AIS/VMS data are used to characterize fishing vessel activity.

Specific Research Question(s): How do non-fishery survey efforts enhance our understanding of fishing activity?

Current Status: Kick-off meeting and meeting summary delivered in September 2021.

Publications Completed: None.

Affiliated WWW Sites: None.

References:

Kraus, S.D., S. Leiter, K. Stone, B. Wikgren, C. Mayo, P. Hughes, R. D. Kenney, C. W. Clark, A. N. Rice, B. Estabrook and J. Tielens. 2016. Northeast Large Pelagic Survey Collaborative Aerial and Acoustic Surveys for Large Whales and Sea Turtles. US Department of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia. OCS Study BOEM 2016-054. 117 pp. + appendices

Russo, T., L. D'Andrea, A. Parisi, M. Martinelli, A. Belardinelli, F. Boccoli, I. Cignini, M. Tordoni, and S. Cataudella. 2016. Assessing the fishing footprint using data integrated from different tracking devices: Issues and opportunities. Ecological Indicators (69): 818-827.