Title	Understanding Potential Economic Impacts to Commercial Fishing from Offshore Wind Energy Facility Construction and Operation
Administered by	Office of Renewable Energy Programs
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Procurement Type(s)	T.B.D.
Approx. Cost	$500 (in thousands)
Performance Period	FY 2019–2021
Date Revised	May 10, 2018
PICOC Summary	
Problem	Fishermen are concerned that cumulative offshore wind energy development will limit their ability to make a living from the ocean
Intervention	Characterize commercial fishing activity within wind energy leases within the regional context; Describe ability and potential impacts of commercial fishers to fish in alternative locations within the larger fisheries management plan environment
Comparison	Not applicable
Outcome	Understand the cumulative economic impact to fisheries from offshore wind development on the Atlantic Outer Continental Shelf
Context	North and Mid Atlantic

BOEM Information Need(s): Building off previous work by NOAA and others, BOEM needs to develop one or more economic impact models that can evaluate a proposed construction and operation plan (COP) and cumulative impacts. As part of National Environmental Policy Act (NEPA) assessments, BOEM must estimate potential economic impacts of offshore wind development to the commercial fishing industry. This information will be used for leases being developed off the coast of New Jersey, New York, Massachusetts, Maryland, Virginia, Delaware, and Rhode Island, of which at least six COP environmental impact statements will be under way in the next five years. Based on conflicting information provided by the fishing community and offshore wind developers, BOEM needs to improve our understanding of impact producing factors (e.g., fishing gear compatibility, effectiveness of mitigation options).The model(s) will evaluate changes in costs and revenue if vessels adjust fishing locations due to construction and operation of offshore wind facilities within a cumulative impact framework.

Background: BOEM has issued thirteen offshore wind energy leases in southern New England and the Mid-Atlantic. Conflicts with fishing is a known challenge when siting leases and though efforts were made to minimize space-use conflicts, fishermen are

concerned about potential economic loss to their livelihood (NEFMC, 2016; FSF et al. v Jewell, 2016). National Oceanic and Atmospheric Administration (NOAA) data indicates that more than $16 million in federally permitted commercial fish revenue may be annually harvested from BOEM leases off the east coast (Kirkpatrick et al., 2017). Examples of potential models exist for some fisheries undergoing a management strategy evaluation (Kukendall et al., 2017). However, several fisheries that may be impacted by offshore wind development are lacking information that is essential to model development, such as characterization of fishing behavior. Uncertainty still exists regarding potential mitigation options (VA CZM, 2016; MAFMC BMP Workshop, 2014).

BOEM published the results of a NOAA report (Kirkpatrick et al., 2017) that discussed the potential exposure of commercial fishing revenue through creation of a database that combined commercial fishing vessel trip reports and observer data to model the likely spatial location of where fish were harvested and linked that spot on the ocean with the received revenue from seafood dealer reports via the methodology described in DePiper, 2014. NOAA found that fish harvest revenue and potentially affected groups of fishermen (e.g., gear type, ports, target species) varied greatly between lease areas. Rhode Island Department of Environmental Management (RI DEM) has tested an alternative methodology using vessel monitoring systems (VMS) with similar fisheries characterization results (RI DEM 2017). The next step is to conduct impact modelling to help understand how the identified fisheries, ports, and fishing gear groups might actually be impacted by proposed activities. For instance, studies in the Irish North Sea (Gray et al., 2016) suggest that highly mobile fishing gear, such as bottom trawls, may not be able to fully utilize the area within a wind facility and public comments to BOEM suggest that certain U.S. fisheries (e.g., groundfish) will have limited areas to fish due to closures called for in fishery management plans.

Objectives: Improve BOEM's ability to conduct economic assessments for wind energy development's impact on commercial fisheries through:

- Enhanced understanding of the impact producing factors (e.g., gear compatibility; mitigation) and best practices of how other agencies determine cumulative effects

- Identification of economic impacts under different development scenarios, accounting for fisheries that vary over space and time and variation in underlying assumptions

- An enhanced spatial understanding through better representations of variation in gear, transit and fishery closures given different development scenarios

Methods:

- Review and synthesize information on various approaches to cumulative impact assessment on commercial fishing, with recommendations for incorporation into BOEM's approach cumulative impact assessments on commercial fishing and provide recommendations for incorporation into BOEM documents.
- Assess NOAA's most recent spatial data of commercial fishing revenue and recent

VMS data to assess fisheries revenue over space and time and develop a tool that will allow BOEM to estimate potential economic impacts based on varying assumptions.

- Develop relevant maps of gear-type usage, probable transit routes, and fishery closure information to help assess and communicate the direct and cumulative impacts from offshore wind development.
- Develop models, such as a location-choice model, to understand potential costs and benefits of vessels adjusting fishing locations in response to offshore wind energy development. The model tool should be flexible to allow the modification of input parameters surrounding:
    - Scenarios related to gear compatibility, biomass changes, mitigation options
    - Fisheries, port, gear type, vessel size, and individual permit level
    - Focused at a site specific COP level and cumulatively
- Conduct workshops with fishing industry and wind energy developers to discuss data generation and mitigation options and vet assumptions and methodology with commercial fishing community.

Specific Research Question: What is the individual and cumulative economic impact of offshore wind energy development on Atlantic commercial fisheries?

References:

DePiper, Geret. June 2014. "Statistically Assessing the Precision of Self-reported VTR Fishing Locations." NOAA Technical Memorandum NOAA Tech Memo NMFS-NE-229. National Marine Fisheries Service. http://www.nefsc.noaa.gov/publications/tm/tm229

Fisheries Survival Fund (FSF) et al. v Jewell, 2016. Case No. 1:16-cv-02409 (D.D.C)

Gray, M., Stromberg, P-L., Rodmell, D. 2016. 'Changes to fishing practices around the UK as a result of the development of offshore windfarms – Phase 1.' The Crown Estate, 121 pages. ISBN: 978-1-906410-64-3

Kirkpatrick, A.J., S. Benjamin, G.S. DePiper, T. Murphy, S. Steinback, and C. Demarest. 2017. Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic. Volumes I & II. U.S Dept. of the Interior, Bureau of Ocean Energy Management.

Kukendall et al. 2017. Management strategy evaluation for the Atlantic surfclam (*Spisula solidissima*) using a spatially explicit, vessel-based fisheries model. NOAA Fish. Bull. 115:300–325.

Mid-Atlantic Fishery Management Council Best Management Practices Workshop (MAFMC BMP Workshop). 2014. https://www.boem.gov/MAFMC-Offshore-Wind-Workshop

New England Fishery Management Council (NEFMC). 2016. Letter to James Bennett from Thomas Nies. Re: Comments to the NY Lease Environmental Assessment.

Rhode Island Department of Environmental Management (RI DEM). 2017. Spatiotemporal and Economic Analysis of Vessel Monitoring System Data within Wind Energy Areas in the Greater North Atlantic. http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf

Virginia Coastal Zone Management Program (VA CZM Program). 2016. Collaborative Fisheries Planning for Virginia's Offshore Wind Energy Area. BOEM, Office of Renewable Energy Programs. OCS Study BOEM 2016-040.