Environmental Studies Program: Ongoing Study

Title	Development of a Strategy to Evaluate NMFS Northeast Fisheries Science Center (NEFSC) Fishery Resource Surveys Affected by Offshore Wind Development
Administered by	Office of Renewable Energy Programs
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Conducting Organization(s)	NOAA National Marine Fisheries Service
Total BOEM Cost	$691,140
Performance Period	FY 2020–2022
Final Report Due	October 2021
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PICOC Summary	
Problem	NMFS/NEFSC fishery resource surveys are used to develop stock assessments and advice for fisheries management, including but not limited to the setting of quotas. NMFS/NEFSC surveys also represent some of the longest marine ecosystem time series globally and have substantial value beyond their application in fisheries. Offshore wind development will affect NMFS scientific survey operations and subsequently the scientific and management products produced for a wide variety of users, including support for BOEM OCS activities.
Intervention	Convene expert workshops and summary report to: 1) Identify specific impacts of offshore wind to the collection of fisheries and ecosystem data and to the provision of scientific advice to management, 2) Determine the most appropriate methods to analyze impacts, and 3) Design a modeling framework (an Observation System Simulation Experiment, OSSE) to enable evaluation of new fishery resource survey methodologies and integrated survey designs compatible with offshore wind development in order to meet high quality scientific and management mission objectives. The OSSE could be funded and conducted in a follow-on study to support survey adaptations.
Comparison	Product methodology will be compared to the previous methodology.
Outcome	Development of a modeling framework (OSSE) using the most appropriate methods to analyze and address the impacts of offshore wind on fisheries surveys and stock assessments. This OSSE would then need to be conducted with additional funding resources, to in turn inform fishery resource survey adaptations and mitigation measures.
Context	Areas along the Atlantic where wind development is being planned and where leases occur as of 2020.

BOEM Information Need(s): This study will be the first step in a process to address questions regarding the impact of offshore wind development in BOEM offshore renewable energy areas in the Northeast on NMFS fisheries, protected species, and ecosystem surveys. These surveys support fisheries assessments and management actions, ecosystem-based fisheries management, and regional and national climate assessments, as well as a number of regional, national, and international science activities. Data gathered from these surveys are also used by BOEM and lessees for planning and

regulatory purposes. One specific use of fishery-independent survey data is for stock assessments, which are the bases of scientific advice used to set stock fishing quotas in the region. BOEM has an obligation to understand how activities that it authorizes may impact the survey and assessment of marine resources. In addition to BOEM's regulations under the Outer Continental Shelf Lands Act as amended by the Energy Policy Act of 2005, the information from this study will help in BOEM's environmental assessments under the National Environmental Policy Act and the Magnuson-Stevens Fishery Conservation and Management Act.

Background: The NEFSC conducts ship-based trawl and dredge surveys targeting federally managed fish and shellfish species. Many fisheries resource surveys are based on a random stratified design, where sampling locations are selected randomly within geographic strata; the strata segregate the Northeast U.S. continental shelf into along-shelf and cross-shelf blocks. Analyses from these surveys are used by the regional fisheries management councils and commissions to calculate annual stock quotas for federally managed species and to develop regulations impacting economically and culturally important fisheries. The development of offshore wind projects on the outer continental shelf will result in areas in multiple strata where survey operations may be limited or excluded. This will disrupt the statistical design used by the NEFSC trawl surveys and increase uncertainty in stock assessments. Wind energy developments may also create bias in the survey data if these developments affect the abundance and distribution of managed species. When uncertainty is introduced into stock assessments, management decisions are less well informed, and the likelihood of inappropriate management actions increases. Poorly informed management actions could lead to overfishing of stocks or to extremely conservative quota levels with significant economic impacts on commercial and recreational fishing industries.

This study will inform the design of an Observation System Simulation Experiment (OSSE), which could then be conducted in a follow-on study. OSSE frameworks are used widely in physical sciences to evaluate observing systems; observing systems are used for specific purposes, e.g. the NEFSC Bottom Trawl Survey is an observing system used to develop fishery independent indices of abundance, which are integral to regional stock assessments. These stock assessments are used by managers to determine the status of fisheries (overfished / overfishing) and to set quotas. The NEFSC proposes to adopt an OSSE framework to evaluate the effects of wind energy development on NEFSC surveys.

An OSSE develops a simulation of an observing system and allows the evaluation of the effect of changes in the observing system (trawl surveys) on end products (the experiments). Assumptions, objectives, scenarios and parameters must be developed and vetted with stakeholders before an experiment can be conducted. In a very simplified example, a simulation of the NEFSC Bottom Trawl Survey is developed and then changes in the survey caused by wind energy development can be evaluated. Experiment 1 might be the exclusion of the bottom trawl survey from one offshore wind lease. Experiment 2 might be exclusion of the bottom trawl survey from all leased areas. Experiment 3 might be exclusion of the bottom trawl survey from all leased areas and all proposed lease areas. In each of these experiments, abundance indices can be calculated and then used in simulated stock assessments to evaluate the effect of wind energy developments on status determinations and quotas.

The OSSE in this study will link observations and statistical design to assessments and to fisheries management decisions explicitly addressing uncertainty and risk policies, resulting in a better understanding of, and ability to address, the impacts of wind energy development on NOAA Fisheries scientific operations. OSSE results will inform survey adaptation with the end goal of future survey methods and statistical designs that are effective, accurate, precise and resilient to any impacts of

offshore wind development. The effort of designing the OSSE, and future efforts to adapt surveys, would include involvement of the scientific community, fisheries managers, the fishing industry, and the offshore wind developer community.

Objectives: The objectives of this study are to define the impacts from offshore wind on NMFS/NEFSC fisheries surveys and to design a modeling framework (an OSSE) that could then be conducted in a follow-on study to adapt NMFS/NEFSC fishery resource surveys to impacts of offshore wind development. The study design of the current project will include expert and stakeholder involvement to review and define specific experimental objectives and questions; identification of appropriate scales of spatial and temporal resolution; and identification of key variables and functional relationships or mechanisms towards the goal of identifying optimal combinations of observing technology and statistical models.

Methods: This project would entail the design and implementation of two scientific workshops and a synthesis report that would bring the necessary scientific, technical, and management expertise together to scope and design an OSSE for fish and/or shellfish surveys. The scope of the effort would be dependent on the funding available. Seven NMFS/NEFSC marine resource surveys have been identified as likely impacted by wind energy development. This initial effort may only address a subset of these surveys. Coordination would occur through the Northeast Regional Coordinating Council to engage necessary fisheries management expertise, and collaboration would be expected with industry stakeholders to develop the workshops and report. The outcome of this effort would be a fully designed OSSE that could then be conducted to inform future survey adaptation needed to address the impacts of offshore wind development on NEFSC scientific surveys. NEFSC would lead this effort in collaboration with BOEM. The tasks required to engage and secure the necessary expertise, support workshop planning logistics, and report drafting and finalizing would be carried out by NEFSC staff and any external support necessary to accomplish objectives. Resources would be provided to NEFSC to ensure dedicated staff support, access and development of the necessary survey/assessment data; and to secure necessary external scientific and technical expertise.

Specific Research Question(s):
How do BOEM wind energy lease areas impact fishery resource surveys and the provisioning of scientific advice for management?

What are the most appropriate methods to employ to evaluate impacts of offshore wind on NEFSC fishery resource survey designs and operations?

How do we adapt fishery resource surveys to be compatible with offshore wind development?

Current Status: The interagency agreement was awarded on August 19, 2020.

Publications Completed: None.

Affiliated WWW Sites: None.