Title	Evaluation of potential Electromagnetic Field (EMF) effects on fish species of commercial or recreational fishing importance
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	Mary Boatman, mary.boatman@boem.gov
Procurement Type(s)	TBD
Approx. Cost	$200,000
Performance Period	FY 2019–2020
Date Revised	February 23, 2018
PICOC Summary	Write one or two sentences for each of the following elements, as appropriate.
Problem	Fishermen are concerned that Electromagnetic Fields (EMF) from cables may affect coastal fish behavior and the fisherman's ability to catch fish.
Intervention	The study will identify the commercial and recreation fish and evaluate their potential for being impacted by electromagnetic fields. This will include examining studies globally where cables are already present.
Comparison	Comparisons could be made between areas with cables and areas without.
Outcome	The study will address public concerns about the EMF from cables affecting their ability to catch certain fish species.
Context	The study will focus on fish species of importance in the Mid-Atlantic nearshore environment.

BOEM Information Need(s): Offshore wind development includes the use of cables, both interarray and to export electricity from the facility to shore. The cables will emit electromagnetic fields (EMF) that may affect sensitive fish species. This study will look at the specific concerns raised by the public about fish species of importance to recreational fishermen (e.g. striped bass, flounder) and their potential interactions with EMF. BOEM will use this information to address the concerns in the relevant sections of EISs prepared to evaluate projects in the Mid-Atlantic.

Background: Offshore wind development requires the use of cables to transport the electricity from the individual turbines to an electrical service platform and from the platform to shore through an export cable. The inter array cables use alternating current while the export cable may be either alternating or direct current. Even with shielding and burial, these cables can produce both electric and magnetic fields that extend some distance into the water column. BOEM funded a literature review that evaluated the potential for EMF to affect species (Normandeau et al., 2011) that identified elasmobranchs and decapods as having the greatest potential for effect as well as a lack of knowledge about the effects of high voltage direct current cables. BOEM funded several studies to address the interactions of decapods with cables, including the recent study *Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and*

skates) and American Lobster Movement and Migration from Direct Current Cables (Hutchison et al., 2018), which updated the literature search of Normandeau et al. 2011. In addition, direct measurements and a review of EMF from cables was conducted in Europe (Thomsen, et al., 2015). This study will address species of specific concern to recreational fishermen and include telemetry data not previously analyzed.

While the effects of EMF are extensively studied, results of these studies are not well communicated to address specific questions raised by the public. In particular, recreational fishermen are not a cohesive group with clear opportunities to communicate. Also, individuals and communities are interested in local species of importance that were not identified as species of significant concern. To address these concerns with the latest science requires identification of the species of interest and evaluation by experts. Clear communication is also needed about existing cables and observed effects or lack of effects.

Objectives: The objective is to evaluate whether EMF impact important recreational fish species.

Methods: Using existing information about electromagnetic fields, existing cables around the world, and key species of interest to recreational fishermen, evaluate the potential effects of EMF on the fisheries. The study may involve identifying local species of interest to recreational fishermen in the Long Island communities, specifically species identified by the New York Department of Environmental Conservation. Communication materials will be developed about EMF, existing cables, and potential for interactions with the identified species of importance. The discussion may extend to known cables that cross major rivers and other observations about fields from bridges. Should a reasonable concern about the potential effects of EMF on key fish species be identified, then a proposed methodology for field work will be included.

Specific Research Question(s): Will EMF from the export cable prevent recreational fishermen along Long Island Sound from catching fish?

References:

Hutchison, Z., P. Sigray, H. He, A.B. Gill, and J. King, 2018. Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and skates) and American Lobster Movement and Migration from Direct Current Cables. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2018-003.

Normandeau, Exponent, Tricas, T and Gill, A. 2011. Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Regulation, and Enforcement, Pacific OCS Region, Camarillo, CA. OCS Study.

Thomsen, F, Gill, AB, Kosecka, M, Andersson, M, Andre, M, Degraer, S, Felegot, T and Wilson, B. 2015. MaRVEN – Environmental Impacts of Noise, Vibrations and

Electromagnetic Emissions from Marine Renewable Energy. Final Study Report. European Commission RTD-KI-NA-27-738-EN-N.