

Environmental Studies Program: Ongoing Study

Title	Supplemental Data Regarding the Behavioral Response of Rock Crabs to Subsea Cables with Electromagnetic Fields (EMF) and Potential Impact to Fisheries (PC-19-02)
Administered by	Headquarters
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Procurement Type(s)	Cooperative Agreement
Conducting Organization(s)	Occidental College
Total BOEM Cost	\$239,995
Performance Period	FY 2021–2023
Final Report Due	October 31, 2022
Date Revised	March 24, 2022
PICOC Summary	
<i><u>Problem</u></i>	The Bureau of Ocean Energy Management (BOEM) requires information concerning the level of impacts from seafloor power cables on marine fisheries. Fishermen are concerned that renewable energy power cables will present an electrified fence on the seafloor that their resource will not cross. BOEM funded an earlier study that showed crabs can cross an electrified cable but the effectiveness of the experimental design should be confirmed.
<i><u>Intervention</u></i>	Conduct additional field surveys to supplement earlier work to verify and resolve experimental design of the initial study.
<i><u>Comparison</u></i>	Compare original conclusions with new conclusions that will be derived using supplemental data to determine if they are different.
<i><u>Outcome</u></i>	Subsea power cable impacts to the crab West Coast fishery need to be addressed and completely examined. This supplemental study will enable a full discussion and will enhance the interpretation of the original work.
<i><u>Context</u></i>	All Pacific OCS planning areas (U.S. West Coast and Hawaii)

BOEM Information Need(s): BOEM requires information concerning the level of impacts from alternating current (AC) seafloor power cables on marine fisheries. Fishermen are concerned that renewable energy power cables and associated EMF will present an electrified fence on the seafloor that their resource will not cross. BOEM also needs scientific results that can be interpreted clearly for decision making.

Background: BOEM funded an earlier study, *Potential Impacts of Submarine Power Cables on Crab Harvest*, designed to test the concern of crab fishermen that their target species will not traverse power cables, even in response to baited traps (Love et al., 2017). Combined with the assistance of professional fishermen, submarine transmission cables that electrify communities and offshore oil platforms in the Pacific Region provided an opportunity to test frequency within which rock crab and Dungeness crab cross power cables. Results of that study showed that crabs will indeed cross an electrified cable in

response to a baited trap. However, in order to support a conclusion that electrified cables have “no impact” on these fisheries, BOEM needs to do additional work. It is possible that due to the design, the responses are confounded with other environmental responses other than cables with EMF. That issue needs to be clearly resolved in order to report a clear result, which is of interest to the fishing community.

Objectives: To verify the behavioral response of commercial crab species in the presence of electrified cables associated with renewable energy projects and controlling for environmental conditions.

Methods: Conduct field experiments that place baited traps up current existing energized power cables in the Pacific Region and in a control area away from the cables offshore of California. This will be done by catching and holding rock crab (via local fishermen, if prudent), releasing crabs down current from power cables and at similar distance from control traps, and maintaining traps, monitoring, and recording catch per fishermen’s practice. Prior to the field work, a power analysis will determine the number of crabs, number of traps, and number of trials needed. Current direction and intensity will be measured throughout the experiment. EMF will be measured before and after the trials.

Specific Research Question(s): Do subsea AC cables with EMF affect the behavior of commercially important rock crabs?

Current Status: Cooperative agreement M21AC00001 between BOEM and Occidental College was awarded on November 18, 2020. The post-award “kick-off” meeting was held on December 7, 2020. All field work was completed as of August 2021, and analysis and interpretation of the data are underway.

Publications Completed: None

Affiliated WWW Sites: <https://marinecadastre.gov/espis/#/search/study/100315>

References:

Love MS, Nishimoto MM, Clark S, McCrea M, Scarborough Bull A. Assessing potential impacts of energized submarine power cables on crab harvests. *Continental Shelf Research* 151 (2017): 23–29.