Marine and Hydrokinetic Effects Assessment and Monitoring

Daniel J. Pondella II
145 Lyndon Street, Hermosa Beach, CA 902545108
Phone: (323 533-3869) E-mail: pondella@oxy.edu

Award Number: DE-EE0006390
Reporting Term: October 2013 to September 2014

LONG-TERM GOALS

To compile and analyze the existing information related to the impacts of electromagnetic fields (EMF) associated with marine and hydrokinetic (MHK) technologies on the behaviors and movements of fishes with focusing on electro-sensitive species in the region around Hawaii.

OBJECTIVES

1. Conduct a review of relevant literature.
2. Based on the currently available information, evaluate the potential risks of interactions with MHK devices for specific species or taxonomic groups from the region around Hawaii.
3. Develop recommendations for data collection to close any important knowledge gaps regarding the potential interaction of fishes and MHK technologies.

APPROACH AND WORK PLAN

Based on the currently available information, the Vantuna Research Group (VRG) will evaluate the potential for specific fish species or taxonomic groups from the region around Hawaii to interact with electromagnetic fields (EMFs) generated by marine and hydrokinetic (MHK) devices. This will be informed by predictions of EMFs from MHK technologies, comparisons from other industries, and known responses of fishes to comparable EMF fields. We will develop a Relative Vulnerability Index which may include factors such as potential encounter rate, detectable response and detectable impacts on individuals and/or populations.

Dr. Dan Pondella and Dr. Jeremy Claisse are leading the project and developing the Relative Vulnerability Index and future research recommendations. Jonathan Williams and Laurel Zahn are performing the literature search and participating in the literature review. Chelsea Williams is performing document management, budgeting and accounting support.

Over the coming year we will complete the literature search and review and finalize the Relative Vulnerability Index. This index will then be applied to rank each focal species from the Hawaii region in order to develop recommendations for data collection to close any important knowledge gaps in knowledge regarding the potential interaction of fishes and MHK technologies.

WORK COMPLETED

So far we have made substantial progress in the literature search for published research on EMF sensitive fish species and other relevant research on offshore energy generating technologies. We have constructed a matrix of columns of life history parameters, fish movement and EMF

sensitivity metrics with a focal species list for Hawaii. We developed a preliminary version of our Relative Vulnerability Index and delivered it to DOE/BOEM. This was then discussed during a meeting with DOE/BOEM representatives in August 2014 and revisions have been made based on their input.

RESULTS

No significant results so far.

IMPACT AND APPLICATIONS

Economic Development

This project will facilitate the deployment of new marine and hydrokinetic (MHK) energy generating technologies throughout U.S. waters while minimizing their impact on important fish species.

Quality of Life

The results of our study will have broad applicability to MHK projects located throughout U.S. waters, with an emphasis on the Hawaii region, as we will report the current state of knowledge related to the range of sensitivities to EMFs in specific fishes, the role they play in navigation, migration and in other important behaviors during critical life stages, and the potential implications of MHK effects over multiple time and spatial scales.

Science Education and Communication

This project will make available a synthesized understanding of the sensitivities of fishes to electromagnetic fields, the role they play in navigation, migration and in other important behaviors during critical life stages.

TRANSITIONS

Economic Development

This project will facilitate the evaluation of potential ecosystem impacts due to the deployment of new marine and hydrokinetic energy generating technologies in U.S. waters.

Quality of Life

This information will be used by managers to guide future research and minimize the ecosystem impacts from new marine and hydrokinetic energy generating technologies in U.S. waters.