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Annex IV State of the Science - sharing what we know about environmental effects of marine renewable energy development internationally

Early deployments of wave and tidal energy projects are providing information on environmental effects of the devices, moorings, and power cables; these data will help inform later deployments and guide regulatory decisions as the industry moves towards the commercial scale. However, there is still considerable uncertainty about many potential interactions of devices and systems with the marine environment that concern regulators and stakeholders.

Through a comprehensive review effort, our team has investigated overall risks to the marine environment from deployment of single marine renewable energy (MRE) devices, and the initiation of larger arrays. Annex IV, an initiative under the Ocean Energy Systems, has produced a report on the *State of the Science for Environmental Effects of MRE development*. The final report was published in April 2016 and is available online at <http://tethys.pnnl.gov/publications/state-of-the-science-2016>. The highlights and significant findings of this study will be discussed, including a look at many of the interactions of MRE devices with marine animals and habitats that are slowing permitting (consenting) processes. This paper will also look at the overall risk from MRE devices, and how we can move forward in the face of considerable scientific uncertainty.

Annex IV is led by the US and is supported through participation by nations with a mutual interest in examining environmental effects of marine renewable energy (MRE). During the second phase of Annex IV (2013-2016), thirteen nations participated in Annex IV.

Biography

Andrea Copping is the research lead for ocean energy development for Pacific Northwest National Laboratory (PNNL), on behalf of the U.S. Department of Energy. Dr. Copping's projects focus on environmental effects from the development of wave and tidal energy and offshore wind installations, and the role that these effects play in technology development and project initiation across the nation. Using risk-based approaches, the research team lead by Dr. Copping integrates laboratory, field, and modeling measurements into a coherent body of evidence to support siting and permitting decisions. Andrea leads international projects on environmental effects of marine energy development (Annex IV) and on wind (WREN) that shares environmental effects information in order to benefit from progress made around the world. Dr. Copping is a Distinguished Faculty Fellow in the School of Marine and Environmental Affairs at the University of Washington, Associate Editor of the Coastal Management Journal, and on the Editorial Board of the International Journal of Marine Energy.

Although trained as a blue water biological oceanographer, Andrea has spent most of her professional career examining the interactions of humans and the marine environment.