

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

Andrea Copping \*

*\*Pacific Northwest National Laboratory*

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.

Overall risks to the marine environment have been investigated from single marine renewable energy (MRE) devices, and 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>. Research and monitoring results since the report publication have been added to the overall picture of potential environmental effects. Effects highlights and significant findings 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.