

Nelson PA, D Behrens, J Castle, G Crawford, RN Gaddam, SC Hackett, J Largier, DP Lohse, KL Mills, PT Raimondi, M Robart, WJ Sydeman, SA Thompson, S Woo. 2008. Developing Wave Energy In Coastal California: Potential Socio-Economic And Environmental Effects. California Energy Commission, PIER Energy-Related Environmental Research Program & California Ocean Protection Council CEC-500-2008-083

Growing interest in converting the energy of California's ocean waves into electricity is matched by concerns regarding the potential effects of wave energy conversion technology on marine resources. This study finds ecological and socio-economic challenges associated with wave energy conversion are likely to depend fundamentally on project scale and location. Social and cultural impacts to fisheries, marine transportation, and some recreation are expected, and may have economic ramifications. Changes to the physical environment are predicted to result from a reduction in wave energy and alterations to nearshore wave-driven processes. Benthic communities may exhibit direct or indirect responses to these changes, with the potential for non-linear effects. Fish are expected to use wave energy conversion installations as artificial habitat, and environmental perturbations such as acoustic or electro-magnetic stimuli may affect behavior. Marine bird and mammals effects are expected to be minimal, but there is cause for caution regarding select species. Dramatic ecological, social, or economic effects are not clearly indicated by this study, but a strong case for caution is supported when developing wave energy conversion technology off the California coast. Impacts to human activities, wave exposure, benthic communities, fishes, birds and mammals are all virtually certain, but the impacts' magnitudes and the cumulative effects remain difficult to anticipate.

Keywords: wave energy; nearshore; fisheries; transportation; wave shadow; benthic; non-linear; artificial reef; Fish Aggregation Device; collision; migration; ocean observing; monitoring