Large-Scale Marine Protected Areas displace fishing effort and induce behavioral changes in fishing vessels

Juan CarlosVillaseñor-Derbez* juancarlos@ucsb.edu

John Lynham† lynham@hawaii.edu

Abstract

Large-scale Marine Protected Areas (LSMPAs) have seen a significant increase over the last years. Fishing effort is effectively eliminated within these protected areas upon implementation. The benefits of reducing effort have been largely studied, but little empirical works evaluate how vessels react and redistribute after an MPA is created. The economic and ecological implications of displacing fishing effort are not yet fully understood. We use identification of fishing activity via Automatic Identification Systems (AIS) and causal inference techniques to provide the first analysis of behavioral changes and spatial redistribution of tuna purse seiners due to the implementation of a Large Scale Marine Protected Area in the Pacific Ocean. Our work provides three main findings: 1) aggregate fishing effort remains relatively unaffected; 2) vessels that fished inside the protected area redistribute to adjacent waters; and 3) we observe a crowding effect for the first months after implementation. Our results not only provide an impact evaluation of the effect of LSMPAs on fishing activity, but provide insights into vessel redistribution dynamics, which may have ecological and economic implications for marine conservation and fisheries management. As countries continue to implement LSMPAs as a way to reach the stated 10% target of ocean protection, managers should consider how fishing effort will change in space and through time to ensure that fishing effort is not just displaced elsewhere, leading to overfishing in adjacent waters. While LSMPAs can provide a wide range of benefits, their implementation must be accompained with traditional fisheries management to maximize their effectiveness.

*Bren School of Environmental Science & Management, University of California Santa Barbara, Santa Barbara, CA

†Department of Economics, University of Hawaii at Manoa, Honolulu, HI