

Tropical Cyclones, Derelict Traps, and the Future of the Florida Keys Commercial Spiny Lobster Fishery

Amy V Uhrin, NOAA, Office of Response and Restoration, Marine Debris Division, Silver Spring, MD, United States; University of Wisconsin, Zoology, Madison, WI, United States

Abstract

Derelict spiny lobster (*Panulirus argus*) traps may move hundreds of meters during high wind events, resulting in tissue abrasion, breakage, and often complete removal of critical seagrass, sponge, and coral habitat. The legacy of commercial trap debris in the Florida Keys (USA) combined with possible increased inputs of debris resulting from a future rise in storm intensity presents an immediate challenge for fisheries management and the sustainability of this fishery where social and ecological vulnerabilities to disturbance are intrinsically linked. Here, predictions of trap loss in relation to wind speed under three scenarios of future tropical cyclone intensification were evaluated across four levels of fishery effort. Across all tropical cyclone intensity scenarios, *Excessive* effort produced the greatest number of lost traps, followed in decreasing order by *Existing*, *Expected*, and *Optimal* efforts. Under a *Business-as-Usual* scenario (*BAU*) of tropical cyclone activity, converting from *Existing* effort to *Optimal* effort reduced trap loss by over 60%. The scenarios suggest that were *Existing* fishery effort to be maintained in the coming decades, tropical cyclone-related trap loss could exceed 4.6-million depending upon the rate of storm intensification. Existing trap retrieval programs cannot remove trap debris equal to the rate it is currently accumulating. The net increase in derelict traps will only be exacerbated under an uncertain future of tropical cyclone intensification. This study also underscores the value of scenarios for exploring these issues, particularly evaluation of fisher responses to change.