

Improving Fishermen Awareness to Reduce the Presence of Lobster Traps in MPAs of the Florida Keys

Mejorando el Conocimiento de los Pescadores para Reducir la Presencia de las Nasas de Langosta en las AMPs de los Cayos de la Florida, USA

Améliorer la Sensibilisation des Pêcheurs à Réduire la Présence de Casiers à Homards dans des Cartes de la Florida Keys

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EXTENDED ABSTRACT

Coral reefs throughout the Florida Keys have been declining for decades and several types of marine protected areas (MPAs) with different regulatory structures were established to provide coral protection. Interactions between fishing gear and marine habitats, particularly coral reefs, is broadly recognized (Turner et al. 1999, Barnette 2001, Donnan 2001). Specifically in the Florida Keys, the use of spiny lobster traps is one of the many causes of coral loss (Lewis et al. 2009). Traps fished in coral reefs can scrape or dislodge corals when the traps are dropped and hauled during normal fishing operations (Sheridan et al. 2005). Strong winds can also move traps into coral reefs (Lewis et al. 2009, Uhrin et al. 2014). Wind driven trap movement tends to scour the seafloor and is the primary mechanism by which lobster traps damage coral reefs (Lewis et al. 2009).

To better protect coral reefs, State of Florida and Federal agencies have established several types of MPAs each with unique regulations. The three MPA types evaluated in this study prohibited the use of traps within their boundaries. Florida Keys National Marine Sanctuary's, Sanctuary Preservation Areas (Sanctuary MPAs) are marked on navigation charts and with large boundary buoys. John Pennekamp Coral Reef State Park's Lobster Exclusion Zones (State MPAs) are not marked on navigation charts but have boundary buoys. National Marine Fisheries Service's No Lobster Trap Areas (NMFS MPAs) are not marked on charts and do not have boundary buoys. The NMFS MPAs were established in 2012, and are the newest and some of the smallest MPAs in the Florida Keys.

We conducted this study to evaluate if different boundary markings and designation of the MPAs on nautical charts provided different levels of recognition and avoidance of the MPAs by fishermen. Methods used during this study included both field surveys of traps in MPAs and outreach to commercial fishermen. We surveyed three types of MPAs and recorded the location of each trap in all 18 Sanctuary MPAs, in all nine State MPAs, and 18 of 60 NMFS MPAs. We also recorded the fishing permit number on each trap to identify each fishermen with traps in the MPAs. The surveys were conducted near the beginning and height of the lobster fishing season during September 2014 and September 2015. The surveys in 2014 provided a baseline description of the traps in the MPAs, while the surveys in 2015 allowed us to evaluate if the educational campaign affected the number of traps in the MPAs. The educational campaign included two forms of notification about the MPAs. A courtesy notice was attached to the buoy of each trap found in an MPA. The courtesy notice included a description of the MPA and a link to a website describing the MPA. Every lobster fishermen was also mailed a brochure (GMFMC 2014) describing the new NMFS No Lobster Trap areas.

The results of the trap surveys included information on both the number, location, and ownership of traps in each MPA type. The vast majority of traps were found in the NMFS MPAs. Traps were evenly distributed throughout these MPAs suggesting that their boundaries were not well known to lobster trap fishermen. Some of the NMFS MPAs were also the smallest areas ever designated for coral protection in the Keys. While these small areas improve fishermen access to adjacent non-coral areas, the small size might exacerbate wind-driven movement of traps into MPAs. In contrast, fewer traps were observed in the MPAs with boundary buoys (Sanctuary and the State MPAs). Most traps were within 50 m of the MPA boundary suggesting that fishermen knew where the MPA boundary was located and chose to use traps along the edge and occasionally within the boundary of the MPA.

The results of our research highlight a few important considerations for the management of MPAs. Targeted education efforts can improve fishermen awareness and ultimately lead to improved compliance with MPAs. Targeted education was possible because of Florida's trap licensing system which requires identification of each buoy and trap to a specific fishermen. Fishermen awareness and compliance was improved by physically marking MPA boundaries. Finally, when designing MPAs, it is important to incorporate fishermen's behavior, in this case using traps near the boundaries of the MPAs, so that the size and location of the MPAs can adequately protect the corals. The apparent tendency for fishermen to utilize a self-delineated 50 m buffer near the boundary of marked MPAs is relevant to the placement of MPA boundaries and the size of MPAs. The utilization of small MPAs to protect specific coral formations lessens the displacement of fishermen from broad areas, but boundary marking, fishermen awareness of closed fishing areas, and fishing behavior (trap placement) remain relevant components for coral protection in the Florida Keys and likely in MPAs developed to protect any resource.

ACKNOWLEDGEMENTS

This project was supported by funds from the NOAA Coral Reef Conservation Program awarded through the National Fish and Wildlife Foundation (Project No. 0302.14.043840). We thank J. Hunt for his input in the design and development of this project. We also thank C. Butler, E. Hart, J. Renchen, J. Kidney, and D. Eaken for their assistance with field work.

LITERATURE CITED

- Barnette, M.C. 2001. A review of the fishing gear utilized within the Southeast Region and their potential impacts on essential fish habitat. NOAA Technical Memorandum NMFS-SEF SC-44 9, 62 pp.
- Donnan, D. 2001. Effects of fishing on non-target species and habitats. biological, conservation and socio-economic issues, edited by M.J. Kaiser and S.J. De Groot. Blackwell Science, Oxford, 2000. *Aquatic Conservation: Marine and Freshwater Ecosystems* 11(6):488.
- Gulf of Mexico Fishery Management Council. 2014. A guide to closed areas for commercial spiny lobster trap fishing. Gulf of Mexico Fishery Management Council, 25 pp. <http://gulfcouncil.org/docs/Public%20Hearing%20Guides/Spiny%20Lobster%20Closed%20Areas%20for%20Commercial%20Trap%20Fishing.pdf>.
- Lewis, C.F., S.L. Slade, and T.R. Matthews. 2009. Lobster trap impact on coral reefs: effects of wind-driven trap movement. *New Zealand Journal of Marine and Freshwater Research* 43:271-282.
- Sheridan, P., R. Hill, G. Matthews, R. Appeldoorn, B. Kojis, and T. Matthews. 2005. Does trap fishing impact coral reef ecosystems? An update. *Proceedings of the Gulf and Caribbean Fisheries Institute* 56:511-519.
- Turner, S.J., S.F. Thrush, J.E. Hewitt, V.J. Cummings and G. Funnel. 1999. Fishing impacts and the degradation or loss of habitat structure. *Fisheries Management and Ecology* 6:401-420.
- Uhrin, A., T.R. Matthews, and C. Lewis. 2014. Lobster trap debris in Florida Keys National Marine Sanctuary: distribution, abundance, density, and patterns of accumulation. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 6(1):20-32.