
Using fisheries data to identify pelagic predator hotspots in the North Atlantic

Niall Mcginty*[†], Pedro Afonso¹, and Frederic Vandeperre²

¹IMAR – Portugal

²University of the Azores – Portugal

Abstract

Unwanted catches of important top level pelagic predators pose a major conservation concern for pelagic long line fisheries. Pelagic elasmobranchs (sharks and rays) represent one of the largest non-target groups that are routinely caught in long line fisheries. These species exhibit many different ecological characteristics but most will typically have low productivity and subsequently have a high vulnerability to exploitation. Popular regression methods for modelling fisheries data only allow a single species to be modelled at any one time with the model covariates. While results can be overlaid to locate multispecies hotspots they fail to consider any possible interactions in species spatial behaviour that might help identify these areas. Multivariate adaptive regression spline (MARS) models have developed interest as a viable alternative for habitat modelling in recent years. Multiresponsive MARS models allow for multiple species to be modelled within the same framework by minimizing the error between species for the shared model covariates. The method has proved to be successful in many ecological examples identifying essential species habitats and often outperforms the more commonly used regression techniques of GAM and GLM. Here we consider the use of multiresponse MARS as a novel method for identifying multispecies hotspots of sharks within tuna fisheries data collected between 2008 and 2011 in the North Atlantic. The results from this work will go towards informing future management decisions that will help maximise the effect of mitigation measures for a wider range of non target shark species.

Keywords: sharks, multispecies, longline, modelling, MARS, GAM

*Speaker

[†]Corresponding author: mcgintyn@gmail.com