

**Using simulated catch data from blue marlin and swordfish habitat models to examine different methods of bycatch reduction**

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**Abstract**

Blue marlin (*Makaira nigricans*) are incidentally caught as bycatch in the Atlantic by the pelagic longline fishery. The recent assessment conducted by ICCAT classified blue marlin as both overfished and experiencing overfishing. Efforts aimed at diminishing the incidental take of blue marlin by the longline fishery have centered on time-area closures and adaptations to gear configuration while at the same time limiting reductions to target catches, such as swordfish (*Xiphias gladius*). Real world testing of different bycatch reduction approaches can be costly and logistically challenging. Species distribution models of blue marlin and swordfish were paired with a longline CPUE data simulator (LLSIM) to simulate fisheries data from blue marlin and swordfish populations with distinct habitat preferences and known underlying population structures. These datasets were used to identify regions with high quantities of bycatch and low target catches as sites for potential time-area closures. Additionally, gears within the simulator were modified to test different gear configurations to determine if these changes could result in a reduction of blue marlin bycatch without diminishing swordfish catches.

**Keywords:**

swordfish, blue marlin, bycatch, habitat modeling, catch per unit effort, data simulation, population modeling, circle hooks, time-area closure

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