

Pacific-wide study reveals striped marlins' preferred habitat, may help avoid overfishing

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Direct field observations and common habitat patterns provide 'much needed information to formulate clear management measures to rebuild striped marlin stocks,' say first author Tim Lam and marine ecologists studying marlin in the Pacific. Credit: Michael Domeier

In the largest study to track striped marlin in the Pacific Ocean, marine ecologists report the preferred habitat of this valuable commercial and recreational fish by using direct observations collected by satellite tags. Details appear this month in an early online edition of *Fisheries*

Research.

Using the largest tagging data set to date, lead author Chi Hin "Tim" Lam of the University of Massachusetts Amherst's Large Pelagics Research Center in Gloucester, Mass., with colleagues at the University of Southern California, Los Angeles, and the Marine Conservation Science Institute of Waikoloa, Hawaii, show that across the Pacific Ocean the vertical habitat of striped marlin is defined by the light-penetrated, uppermost part of the ocean known as the epipelagic layer, within 8 degrees C of [sea surface temperature](#).

Overfishing is already occurring for striped marlin in certain parts of the Pacific Ocean, the authors point out. They say their findings should help to avoid or reduce undesired catch of this species by removing hooks shallower than about 390 feet (120 meters), for example. It is important to characterize the marlins' water column activity because if striped marlin occupy a vertical habitat different from commercially more important species like tuna, fishers can exploit this separation to target higher-value species and avoid catching striped marlin, Lam notes.

For this work, the researchers deployed about 250 smart tags, or popup satellite archival tags, valued at roughly \$4,000 per unit, over five years across eight field locations from Australia to Hawaii and Ecuador to Southern California, providing one of the largest data sets for any species in the open ocean.

Tags returned depth, temperature and light-based positional data for up to eight months. The authors found that striped marlin demonstrated "pronounced use" of the mixed layer, with fish spending 54 to 84 percent of their time at the top 40 feet of the ocean surface (10 meter) across all regions. The mixed-layer is between the surface and a depth of roughly 80 to 656 feet (25 to 200 m), where salt and temperature levels are about the same as at the surface. Lam and colleagues add that

individuals remained near the surface in nighttime and were located near the bottom of the mixed layer during the day.

Newly observed behaviors reveal striped marlin have short-term cold and low oxygen tolerance. Temperature and depth data from tagged fish show a broader range of habitat than scientists had noted before. Fish exploited cold water, lower than about 60 degrees F (15 degrees C) or low-oxygen environments for short durations of 10 to 40 minutes, presumably for hunting and avoiding predators.

Lam says this study is important because its coverage allows researchers to identify "common patterns of striped marlin behavior to be identified throughout the Pacific Ocean." Direct field observations and common habitat patterns provide "much needed information to formulate clear management measures to rebuild striped marlin stocks," the authors say.

"Understanding vertical habitat characteristics of striped marlin is necessary for evaluating their vulnerability to gear, for identification of realistic bycatch reduction measures, and for providing spatially explicit information in stock assessments," he and his colleagues conclude.

More information: *Fisheries Research*,
www.sciencedirect.com/science/.../ii/S0165783615000296

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