

Growing hypoxic zones reduce habitat for billfish and tuna

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This Atlantic sailfish was tagged by NOAA scientists off Senegal as part of a study on how oxygen depleted zones in the eastern Atlantic Ocean affect fish habitat. Credit: NOAA

Billfish and tuna, important commercial and recreational fish species, may be more vulnerable to fishing pressure because of shrinking habitat, according to a new study published by scientists from NOAA, The Billfish Foundation, and University of Miami Rosenstiel School of Marine and Atmospheric Science.

An expanding zone of low oxygen, known as a hypoxic zone, in the Atlantic Ocean is encroaching upon these species' preferred oxygen-abundant [habitat](#), forcing them into shallower waters where they are more likely to be caught.

During the study, published recently in the journal *Fisheries Oceanography*, scientists tagged 79 sailfish and blue marlin with satellite tracking devices in the western North Atlantic, off south Florida and the Caribbean; and eastern tropical Atlantic, off the coast of West Africa. The pop off archival satellite tags monitored horizontal and vertical movement patterns. Researchers confirmed that billfish prefer oxygen rich waters closer to the surface and will actively avoid waters

low in oxygen.

While these hypoxic zones occur naturally in many areas of the world's tropical and equatorial oceans, scientists are concerned because these zones are expanding and occurring closer to the sea surface, and are expected to continue to grow as [sea temperatures](#) rise.

"The hypoxic zone off West Africa, which covers virtually all the equatorial waters in the Atlantic Ocean, is roughly the size of the continental United States, and it's growing," said Dr. Eric D. Prince, NOAA's Fisheries Service research fishery biologist. "With the current cycle of climate change and accelerated global warming, we expect the size of this zone to increase, further reducing the available habitat for these fish."



Samples of surface skin slime are taken from the Atlantic sailfish to determine gender. Credit: NOAA

Less available habitat can lead to more fish being caught since the fish are concentrated near the

surface. Higher catch rates from these areas may give the false appearance of more abundant [fish stocks](#). The shrinking availability of habitat and resulting increases to catch rates are important factors for scientists to consider when doing population assessments.

Researchers forecast that climate change and its associated rise in ocean temperatures will further increase the expansion of hypoxic zones in the world's oceans. As water temperature increases, the amount of oxygen dissolved in water decreases, further squeezing billfish into dwindling available habitat and exposing them to even higher levels of exploitation.

More information: Fisheries Oceanography article:
[onlinelibrary.wiley.com/doi/10...
419.2010.00556.x/pdf](https://onlinelibrary.wiley.com/doi/10.1111/j.1365-3113.2010.00556.x/pdf)

Provided by NOAA

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