

Mapping pinpoints turtles' danger zones

Satellite and fisheries data show areas in Atlantic Ocean where leatherback turtles and fishermen clash.

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Michael Patrick O'Neill/Alamy

Leatherback turtles are highly susceptible to unintentional capture by longline fisheries.

The Atlantic Ocean is home to the last large populations of leatherback turtles — but it is not always a hospitable habitat. The migratory nature of the turtles, the world's largest, makes them vulnerable to unintended capture by fishermen.

But with such 'bycatch' largely unreported, and the leatherbacks (*Dermochelys coriacea*) meandering across wide swaths of the Atlantic, understanding how best to protect them has been difficult. Now scientists have used satellite data that tracks turtle paths between 1995 and 2010 to help identify nine zones in the Atlantic Ocean where leatherbacks and fishermen are most likely to clash¹.

"We know bycatch is a huge problem, but it's knowing where, when and in what fisheries that hasn't been clear," says Brendan Godley, a conservation scientist at the University of Exeter, UK, and lead author of the study published today in *Proceedings of the Royal Society B*.

Godley's research pinpoints four high-risk sites in the north Atlantic and five in the south Atlantic^[1], including areas within the exclusive economic zones of 12 different countries — among them the United States and United Kingdom.

Atlantic leatherback populations are relatively robust compared to their Pacific Ocean counterparts, which have declined to the point that they are considered "critically endangered" by the International Union for the Conservation of Nature. A similar study published in January² found few areas showing high interaction between Pacific leatherbacks and fishermen — most likely because the turtle population there had already been wiped out, possibly because of bycatch, says John Roe, a biologist at University of North Carolina at Pembroke who led the research.

Reversing this trend in the Pacific will be difficult, if not impossible, says Matthew Witt, an Exeter conservation biologist who co-led the Atlantic Ocean study. "We're trying to avert what happened in the Pacific," he says.

His team combined satellite data showing standardized tracks from over 100 turtles, correcting for bias in spatial, with longline-fisheries data to identify areas of low, medium and high interaction between humans and turtles. Their map covers the Atlantic in a grid with

squares measuring 5 degrees latitude by 5 degrees longitude.

Rebecca Lewison, a conservation ecologist at San Diego State University in California, says that such analyses make it harder for governments to ignore the danger bycatch poses to migratory species such as the leatherback. “If we are serious about preventing extinctions of pelagic species, we have to look at these ocean-wide scales,” she says.

Ultimately, though, it is coastal fishing gear, such as gillnets and trawls, that may pose the greatest risk to the turtles. With that in mind, researchers hope to incorporate data on those dangers into future maps.

“The ocean is constantly changing,” says Peter Dutton, a biologist with NOAA in La Jolla, California. “We ultimately want to create tools that can predict where leatherbacks will be, and use those tools to help fishermen make decisions on where to fish.”

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References

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2. Roe, J. *et al. Proc. R. Soc. B* <http://dx.doi.org/10.1098/rspb.2013.2559> (2014).