New models may reduce seabird bycatch

April 4 2011

Tens of thousands of albatrosses and other far-ranging seabirds are killed each year after they become caught in longline fishing gear. Innovative new models developed by a Duke University-led research team may help reduce these casualties by more precisely projecting where and when birds and boats are likely to cross paths.

The models use remotely sensed physical and biological data to predict changing conditions – such as sea surface temperatures or the availability of phytoplankton – that make different parts of the ocean suitable habitats for foraging, nesting and other seabird behaviors at different times of the year, or from year to year.

Conservationists and fisheries managers can overlay maps of predicted habitat suitability onto maps of longline fishing activity and telemetry-tracked bird migrations to better avoid bird bycatch.

Old bycatch models don't account for these dynamic factors; they rely almost exclusively on static overlays based on historic fishery and bird-tracking data.

The Duke-led team tested the new models in case studies of two species of pelagic seabirds, the Laysan albatross and the black-footed albatross, whose long-distance migrations intersect areas of heavy swordfish and tuna fishing activity in Hawaiian fisheries. The studies used historic bycatch and tracking data from 1997 to 2000. Results were published March 23 online in the British peer-reviewed journal *Proceedings of the Royal Society B*.

The models' predictions corresponded closely to actual historic bycatch observations, says lead researcher Ramunas Zydelis, a postdoctoral research associate at Duke's Center for Marine Conservation. Black-footed albatrosses were more frequently caught in 1997-2000 despite being 10 times less abundant than Laysan albatrosses, probably because their habitat overlapped more with fisheries, according to the model's predictions.

Zydelis says the findings demonstrate that the new models "may be especially useful in cases where seabird tracking data do not fully represent the population" or reflect the full extent of its current or potential geographic range.

For instance, the models predicted suitable habitats for Laysan albatrosses along the California Current in the eastern Pacific, despite the fact that none of the birds tracked in the study traveled there, he says. Conservationists who relied on old, static models wouldn't have been forewarned about possible bycatch interactions in that region, even though Laysan albatrosses are known to forage in the current's rich waters.

The models also predicted suitable habitats for black-footed albatrosses from July to October in the Sea of Okhotsk in the northwest Pacific, though no recent tracking data suggests the species' distribution extends that far.

One possible explanation, says co-author Larry B. Crowder of Duke, may be that huge numbers of black-footed albatrosses were hunted and killed for their feathers in that region during the 19th and early 20th centuries, effectively wiping out the modern population, even though archeological evidence suggests the birds were widespread there in pre-modern times.

"Whether the models have correctly identified potential or recent black-footed albatross range is unknown," says Crowder, director of the Center for Marine Conservation and Stephen Toth Professor of Marine Biology at Duke's Nicholas School of the Environment. "Nevertheless, it underscores the potential for dynamic models to provide new information on animal distribution."

Provided by Duke University

Citation: New models may reduce seabird bycatch (2011, April 4) retrieved 25 April 2024 from https://phys.org/news/2011-04-seabird-bycatch.html