The North Atlantic right whale is in poor condition

A suggestion: **Individual North Atlantic right whales are in much poorer condition than Southern right whales**

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New research by an international team of scientists reveals that endangered North Atlantic right whales are in much poorer body condition than their counterparts in the southern hemisphere. The alarming results from this research, led by Dr Fredrik Christiansen from Aarhus University in Denmark, were published this week in the journal *Marine Ecology Progress Series* (MEPS 640:1-16 (2020).

Since the cessation of large-scale commercial whaling in the last century, most populations of southern right whales have recovered well. Now there are about 10,000-15,000 right whales in the southern hemisphere. Unfortunately, the same cannot be said for the North Atlantic right whales, found today mostly off the east coast of North America. There are now around 410 individuals left, and the species is heading to extinction. Lethal vessel strikes and entanglement in fishing gear continue to kill these whales. As well, individual North Atlantic right whales have to deal with the energetic and other costs that come about from frequent sub-lethal entanglements in fishing gear, in particular lobster and crab pots. These burdens, along with a change in the abundance and distribution of their main prey, copepods and krill, have left these whales thin and unhealthy, which makes them less likely to have a calf. This, in turn, contributes to the current overall decline of the species.

To quantify ”thin and unhealthy”, Dr Christiansen and an international team of scientists investigated the body condition of individual North Atlantic right whales, and compared their condition with individuals from three increasing populations of Southern right whales: off Argentina, Australia and New Zealand.

“Good body condition and abundant fat reserves are crucial for the reproduction of large whales, including right whales, as the animals rely on these energy stores during the breeding season when they are mostly fasting”, said Dr Christiansen from Aarhus Institute of Advanced Studies, Denmark, and lead author of the study. Stored fat reserves are particularly important for mothers, who need the extra energy to support the growth of their newly born calf while they are nursing.

How fat are right whales?

The study is the largest assessment of the body condition of baleen whales in the world, and involved researchers from 12 institutes in five countries. The international research team used drones and a method called aerial photogrammetry to measure the body length and width of individual right whales in these four regions around the world. From aerial photographs, the researchers estimated the body volume of individual whales, which they then used to derive an index of body condition or relative fatness.

The analyses revealed that individual North Atlantic right whales: juveniles, adults and mothers; were all in poorer body condition than individual whales from the three populations of Southern right whales. This is alarming, since poor body condition for North Atlantic right whales helps explain why too many of them are dying, and why they are not giving birth to enough calves to boost the population's recovery. It could also be affecting their growth, and delaying juveniles reaching sexual maturity. These combined impacts on individuals helps explain why the species is in decline.

Figure legend: Healthy southern right whales from three populations (left three photographs) next to a much leaner North Atlantic right whale (right) in visibly poorer body condition. Photos: Fredrik Christiansen (left & center-left), Stephen M. Dawson (center-right), John W. Durban and Holly Fearnbach (right)

"It's great to see this work published", said Peter Corkeron, of the Anderson Cabot Center for Ocean Science at the New England Aquarium. "This started out as a conversation between a few of us over dinner at a conference in 2015. Now the results are out, they're quite shocking, even to those of us who have been studying right whales for decades.

We know that North Atlantic right whales as a species are doing poorly, but this work brings home that as individuals, they're also doing poorly. Their decline has been so rapid that we know it's not simply because not enough calves are being born – too many whales are also dying from injuries that we humans are causing. But this study also shows that their decline isn't solely due to these deaths. Their problems are more insidious, and we need to find a way to ensure that the health of all individual whales improves."

"This is a very important application of aerial photogrammetry – making quantitative measurements of body condition by flying a camera high above whales – unfortunately it is not a picture of health for right whales in the North Atlantic" said John Durban, formerly with NOAA Fisheries and now with Southall Environmental Associates, who piloted the drone for the North Atlantic right whale component of this study. "Drones have enabled us to non-invasively and inexpensively measure the whales in several sites around the world – essentially giving them a health check without them even knowing we were there" said co-pilot Holly Fearnbach from SeaLife Response, Rehabilitation and Research.

"For North Atlantic right whales as individuals, and as a species, things are going terribly wrong. This comparison with their southern hemisphere relatives shows that most individual North Atlantic right whales are in much worse condition than they should be." says Michael Moore from the Woods Hole Oceanographic Institution. "As a veterinarian, I've long been concerned about how entanglements affect the welfare of these whales. Now we are starting to draw the linkages from welfare to this species' decline. Sub-lethal entanglement trauma, along with changing food supplies is making them too skinny to reproduce well, and lethal entanglement and vessel trauma are killing them. To reverse these changes, we must: redirect vessels way from, and reduce their speed in, right whale habitat; retrieve crab and lobster traps without rope in the water column using available technologies; and minimize ocean noise from its many sources"

Figure legend: A North Atlantic right whale entangled in fishing gear, one of the main threats to this population. Photo: William Rayment.

“Right whales are a sentinel species of ocean health. They are warning us, and their message is strong – the seas that used to be a safe haven for whales are now a threat. We must act now to protect their home, everybody´s home”, said Dr. Mariano Sironi from Instituto de Conservación de Ballenas and right whale researcher in Argentina.

“We are fortunate that in the south, right whales are thriving. We must continue to protect and learn from these healthy populations and build knowledge that may aid in the recovery of their northern counterparts”, says Dr. Marcela Uhart from the University of California, Davis and founder of the Southern Right Whale Health Monitoring Program in Argentina. “It is encouraging to see right whale scientists around the world joining efforts to inform conservation action. The plight of the North Atlantic right whale is a strong wake up call for us all.”

Scientific article

‘A population comparison of right whale body condition reveals poor state of the North Atlantic right whale’ in: *Marine Ecology Progress Series*, (MEPS 640:1-16 (2020).

by Fredrik Christiansen (Corresponding Author), Stephen Dawson, John W Durban, Holly Fearnbach, Carolyn A Miller, Lars Bejder, Marcela Uhart , Mariano Sironi , Peter Corkeron, William Rayment , Eva Leunissen, Eashani Haria, Rhianne Ward, Hunter A Warick, Iain Kerr, Morgan S Lynn, Heather M Pettis, Michael J Moore.

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