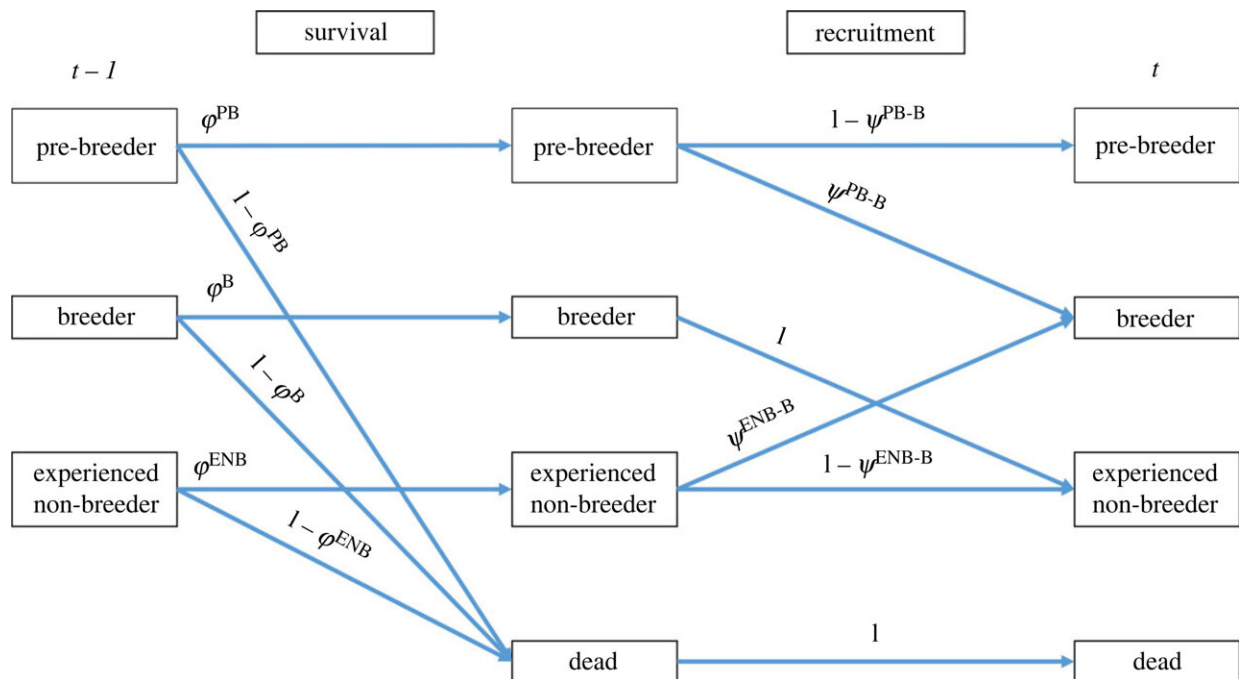


# Rope entanglement found to be a cause of low breeding rates in right whales

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Graphical depiction of the state model, with movement between states displayed by arrows. Model notation: arrows represent survival ( $\varphi$ ) and recruitment ( $\psi$ ), with superscripts referring to the state of the individual, being pre-breeder (PB), breeder ( $b$ ) and experienced non-breeder (ENB). Credit: *Proceedings of the Royal Society B: Biological Sciences* (2024). DOI: 10.1098/rspb.2024.0314

New findings show the severe impact of fishing gear entanglements on the survival of critically endangered North Atlantic right whales, with

every injury from entanglements impacting population recovery.

The study, led by Macquarie University [marine science](#) doctoral candidate Joshua Reed in collaboration with scientists at Ursinus College and Griffith University, was [published](#) in *Proceedings of the Royal Society B: Biological Sciences*.

Modeling of whale-sightings data shows when female right whales get tangled in ropes from lobster and crab pots, they are less likely to calve, potentially leading to extinction for this species.

With only 360 North Atlantic right whales still alive, this is one of the world's most endangered whale species, and its population has rapidly declined over the past decade.

"Poor calving is one of the main factors behind the decline of North Atlantic right whales and, until now, the reason for these whales' failure to calve wasn't clear," says Mr. Reed.

"This study makes it clear that all types of [entanglement](#) in fishing gear impact females' ability to calve, helping address one of the big, outstanding questions for saving North Atlantic right whales."

Known as "the urban whale" because they live in the waters off the heavily populated east coast of the U.S. and Canada, these whales pass millions of fishing ropes and hundreds of ships and boats on their migration each year.

Whales entangled in fishing gear often survive, and their injuries are classified as "minor," "moderate" or "severe."

The researchers analyzed 40 years of data on 199 female right whales, together with known [fishing-gear](#) entanglements rated by severity, to

calculate the impact of these encounters on whale reproduction.

"This study makes clear that using value-laden terms such as 'minor,' 'moderate' and 'severe' to describe the relative severity of scars from entanglements is inappropriate," says co-author Honorary Professor Rob Harcourt from Macquarie University's School of Natural Sciences.

"These terms lead to an unconscious assumption that 'minor' injuries aren't important, when in fact they are."

The research showed pre-breeding age female whales that survive entanglements classed as 'minor' were the least likely to transition to breeding, with individuals in this class being 47 percent less likely to breed than those that were not entangled.

Co-author Assistant Professor Leslie New, a statistical ecologist from Ursinus College in Pennsylvania, U.S., says the study's methodology shows the power of these modeling tools to inform conservation.

"Applying a standard technique in a new way to a well-studied species allows us to come up with a better understanding of how human impacts—in this instance, fishing entanglements—affect these female whales' survival and reproduction," she says.

Co-author Dr. Peter Corkeron from Griffith University says the research delivers the important message that all entanglements matter.

"Weak rope is a technology now used to try to reduce the severity of entanglements, but it doesn't change whether whales will get entangled," he says.

"This paper indicates rope technology won't solve the problem of female [right whales](#)' poor calving. We need to get all rope out of the water

urgently for this species to start to recover."

The findings show management actions toward recovery of the North Atlantic right whale must address both lethal and sub-lethal impacts of entanglements, regardless of severity classification, Mr. Reed adds.

**More information:** Joshua Reed et al, Disentangling the influence of entanglement on recruitment in North Atlantic right whales, *Proceedings of the Royal Society B: Biological Sciences* (2024). [DOI: 10.1098/rspb.2024.0314](https://doi.org/10.1098/rspb.2024.0314)

Provided by Macquarie University

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