Survival of the smallest? Bigger sea species more threatened

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In this Oct. 20, 2009 file photo, a 70-foot female blue whale, that officials believe was struck by a ship, is seen washed ashore on the Northern California coast, near Fort Bragg, Calif. The oceans are turning into a Darwinian topsy-turvy place, where it's survival of the smallest and the bigger a species is, the more prone it is to die off. That's something unheard of in Earth's long history of mass extinctions, a new study finds. As subfamilies of marine animal species, called genera, grow larger in body size, the likelihood of them being classified as threatened with extinction, increases by an even greater amount, according to a study published Wednesday, Sept. 14, 2016, in the journal *Science*. (AP Photo/Larry Wagner, File)

In the Earth's oceans these days, the bigger a species is, the more prone it is to die off. That's unheard of in the long history of mass extinctions, a new study finds.

As subfamilies of marine animal species—called genera—grow larger in body size, the likelihood of them being classified as threatened with extinction increases by an even greater amount, according to a study published Wednesday in the journal *Science*. In past extinctions, smaller creatures were more prone to die off, or size didn't matter, said study lead author Jonathan Payne, a paleobiologist at Stanford University.

Almost none of the genera that have species averaging 0.4 inches (1 centimeter) long are threatened with extinction, But 23 percent of those that are 3.9 inches (10 centimeters) are threatened, 40 percent of those that are 39 inches (1 meter) are endangered and 86 percent of those that are 32.8 feet (10 meters) are vulnerable, Payne said.

These are species that are not extinct yet, but are on the respected Red List of threatened and endangered species created by the International Union for the Conservation of Nature.

"The proportion of species that are threatened increases enormously as body size increases," Payne said.

In this Feb. 6, 2016 file photo, a blue whale raises its tail above the water surface off the coast of Long Beach, Calif. The oceans are turning into a Darwinian topsy-turvy place, where it's survival of the smallest and the bigger a species is, the more prone it is to die off. That's something unheard of in Earth's long history of mass extinctions, a new study finds. As subfamilies of marine animal species, called genera, grow larger in body size, the likelihood of them being classified as threatened with extinction, increases by an even greater amount, according to a study published Wednesday, Sept. 14, 2016, in the journal *Science*.. (AP Photo/Nick Ut, File)

Take the blue whale , not only the largest living animal, stretching close to 100 feet long, but the largest to ever have existed, Payne said. It's on the IUCN endangered list and has lost as much as 90 percent of its population in the last three generations, according to the IUCN.

On the other end of the spectrum is a grouping of fish, bioluminescent bristlemouths , that are about three inches long. They are the most abundant creatures with a backbone; the population is estimated to be in the trillions.

Payne compared fossil records, looked at past mass extinctions and compared them to current threats, concentrating on 264 genera that have the best modern and ancient records. Payne concentrated on oceans, where the fossil records are better over time. The mass extinction 65 million years ago that killed off the dinosaurs didn't kill off bigger marine species at higher rates than smaller ones, unlike what's happening now, Payne said.

The study "shows us how unusual this crisis of biodiversity we have right now," said Boris Worm, a top marine scientist at Dalhousie University in Canada. He wasn't part of the study but praised it. "We have had mass extinctions before. This one is totally different than what has happened before."

Worm spoke from a break during research in Canada's Bay of Fundy, where after a more-than-20-year career he finally saw his first underwater right whale and basking shark .

"They are both in trouble and both among the largest of their kind," Worm said.

Payne's study didn't try to explain why larger animals were more threatened, but both he and Worm point to one main suspect: humans. Mostly through fishing and hunting, but also through environmental degradation such as warmer and more acidic oceans, humans have made it tougher for the biggest marine animals to survive, they said.

Catherine Novelli, the U.S. undersecretary of state for environment, said

a world oceans conference that starts Thursday in Washington, will see the announcement of "many more" areas where nations set aside large areas of the seas where animals are protected and fishing is prohibited.

Duke University biologist Stuart Pimm also praised the study as both compelling and disturbing because "even if some species do hang on, we have massively changed the ecology of much of the oceans."

Payne said there is still hope, since these species haven't gone extinct yet. He points to northern elephant seals which had a population below 100 in the early 1910s, but are now more than 100,000 strong. But they are the exception.

"It pains you to the core to know that these animals might be gone in a generation or two," Worm said. "You can't imagine a world without them. It's such an important and beautiful part of our planet."